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# **Final Investigation Area D1 Remedial Action Plan**

## **Lennar Mare Island Vallejo, California**

Prepared for  
**Regulatory Agencies**

May 2004

Prepared by  
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# Acronyms and Abbreviations

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ABM	abrasive blast material
AL	Assessment Location
AST	aboveground storage tank
bgs	below ground surface
BRAC	Base Realignment and Closure
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CERFA	Community Environmental Response and Facilitation Act
Consent Agreement	Consent Agreement between the DTSC, City of Vallejo, and Lennar Mare Island, dated April 16, 2001
CA/FO	Complaint/Consent Agreement and Final Order between Lennar Mare Island, the City of Vallejo, the U.S. Department of the Navy, and the U.S. Environmental Protection Agency Region IX. EPA Docket No. TSCA-9-2002-0002. December 20.
DoD	Department of Defense
DOM	domestic pump station
DTSC	Department of Toxic Substances Control
EBS	Environmental Baseline Survey
EETP	Eastern Early Transfer Parcel
ESL	Environmental Screening Level
FOPL	fuel-oil pipeline
FOSL	Finding of Suitability to Lease
G-RAM	General Radioactive Material
HI	Hazard Index
IA	Investigation Area
IAS	Initial Assessment Study
IR	Installation Restoration
IRA	interim removal action
IRP	Installation Restoration Program
IWPS	industrial wastewater pump station

IWTP	industrial wastewater treatment plant
LBP	lead-based paint
LI	limited investigation
LMI	Lennar Mare Island, Limited Liability Corporation
MACTEC	MACTEC Engineering & Consulting, Inc
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/L	micrograms per liter
MINS	Mare Island Naval Shipyard
msl	mean sea level
MTBE	methyl tributyl ethylene
Navy	US Department of the Navy
NFA	No Further Action
NNPP	Naval Nuclear Propulsion Program
PAH	polynuclear aromatic hydrocarbon
PA/SI	preliminary assessment/site inspection
PCB	polychlorinated biphenyl
PRC	PRC Environmental Management
PRG	preliminary remediation goal
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RWQCB	San Francisco Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCR	Site Characterization Report
SSPORTS	Supervisor of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia, Environmental Detachment
SWBZ	shallow water-bearing zone
SWMU	solid waste management unit
TPH	total petroleum hydrocarbon
TSCA	Toxic Substances Control Act
TtEMI	Tetra Tech EM, Inc.
TWD	Technical Work Document
UL	Unknown Location

USEPA	United States Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
Weston	Roy F. Weston

# Executive Summary

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CH2M HILL prepared this Remedial Action Plan (RAP) for Investigation Area (IA) D1 in accordance with the Consent Agreement (LMI et al. 2001) signed April 16, 2001, between Lennar Mare Island (LMI), the City of Vallejo, and the State of California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

This RAP demonstrates that within IA D1 the environmental concerns have been identified and either have been resolved or have planned remedial actions under the requirements of Chapter 6.5 and 6.8 of Division 20 of the Health and Safety Code, Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Resource Conservation and Recovery Act (RCRA) and the Consent Agreement, or are being resolved under the requirements of other regulatory programs. Specifically, these regulatory programs are the underground storage tank (UST) and fuel-oil pipeline (FOPL) program, conducted pursuant to Regional Water Quality Control Board (RWQCB) Order R2-2002-0105 (RWQCB Order), and the polychlorinated biphenyl (PCB) program, conducted pursuant to the Consent Agreement and Final Order (CA/FO) between United States Environmental Protection Agency (USEPA) and the United States Department of the Navy (Navy), with the City of Vallejo and LMI as intervenors (USEPA et al. 2001).

The sites and environmental issues in IA D1 that have been identified and evaluated include:

- Two Installation Restoration Program (IRP) sites (IR23 and a portion of IR14).
- One Group II/III site (sanitary sewer pipelines and pump stations in IA D1).
- PCB sites.
- Lead-based paint (LBP) in soil within the former Farragut and Coral Sea Villages.
- LBP in soil around existing structures in IA D1 outside of the former Farragut and Coral Sea Villages.
- Abrasive blast material (ABM) in soil.
- Pesticides in soil at the former Coral Sea Village.
- Black granular material near Building H74.

These sites and issues have been investigated and were either: (1) considered not to represent a significant risk to human health or the environment; (2) resolved through previous remedial efforts to a level such that they no longer represent a significant risk to human health or the environment for the planned land use; or (3) require further investigation and/or remedial action as proposed in this RAP. This RAP summarizes the evaluations that have occurred and those that are planned at these sites. At sites where the remedial efforts have been completed to levels appropriate for unrestricted land uses, this RAP includes the conclusions that support a no further action (NFA) determination. For

sites that require further action including recordation of land-use covenants, the proposed remedies are presented in this RAP.

For completeness, this RAP also identifies additional environmental issues in IA D1 that have been or are being resolved in accordance with the requirements presented in the RWQCB Order or the USEPA CA/FO. This RAP has been prepared concurrently with ongoing work conducted at these additional sites, and this document references the specific reports that present detailed evaluations and closure requests. Consistent with the Consent Agreement, the completion of all investigation and/or remedial action at these additional sites, as well as submittal of the reports presenting the conclusions of the investigations and/or actions, will be received by DTSC prior to issuance of certification for IA D1.

IA D1 is located in the central and southern areas of the property subject to the Consent Agreement and occupies approximately 231 acres. According to the *Preliminary Land Use Plan* (LMI 2000), IA D1 is planned for largely residential and educational uses. "Captain's Row" will be maintained as a historical core area that will be used for non-residential purposes. Historically, structures within IA D1 have been used as military housing and barracks, community service and recreational facilities, medical facilities, prison facilities, offices, garages, storage/service buildings, and light industrial purposes. Many of the structures within IA D1 are within the Historic District Boundary, which qualified specific structures for listing in the *National Register of Historic Places*. In addition, three recreational areas—Farragut Plaza, Chapel Park, and Alden Park—are located near the eastern boundaries of IA D1.

IR23 and IR14 were the only two IRP Group I sites identified in IA D1 through basewide reviews of historical operations at the Mare Island Naval Shipyard (MINS) in the Initial Assessment Study and subsequent studies. IR23 includes the former (partially-buried) fuel storage Tank 772 and associated subsurface piping west of Azuar Drive (formerly Cedar Avenue) between Tisdale Avenue and 9<sup>th</sup> Street in the central portion of the Eastern Early Transfer Parcel (EETP). Tank 772 was used for auxiliary storage of fuel oil for the central steam power plant (Building 121) from 1942 to 1994. In 1979, a hairline fracture was discovered along the upper-third sidewall of Tank 772. Oil-saturated soil was encountered at 6 to 12 feet below ground surface, and an estimated 1,000 gallons of fuel oil were released over time. Repairs were performed in 1982 and 1983 and included the construction of a new leakage collection sump in the pump house adjacent to the tank (PRC 1997a). Because the contamination at IR23 is petroleum, CH2M HILL requested that the site be cleaned and closed in accordance with the RWQCB Order. Both DTSC and the RWQCB approved this request and in July 2002, CH2M HILL implemented a removal action at IR23 targeting elevated concentrations of petroleum hydrocarbons in soil and groundwater. Confirmation soil sample and downgradient groundwater sample results were all below laboratory detection limits for fuel-related constituents. Permanent closure of IR23 was requested in October 2002 (CH2M HILL 2002a) and approved by RWQCB and DTSC in February 2004 (RWQCB 2004; DTSC 2004).

IR14 is the former industrial wastewater collection system, including underground piping and pump stations. The system was designed to collect, pre-treat, and convey wastewater from various sources to the industrial wastewater treatment plant (IWTP). Approximately 1,500 feet of industrial wastewater pipeline runs through the northern part of IA D1. The pipeline runs from Industrial Wastewater Pump Station No. 10 (IWPS No. 10), located south

of Building 201, to the medical clinic. IWPS No. 10 likely was constructed when Building 201 was built in 1985 to collect and convey wastes from the medical clinic into the IWTP collection system. The entire system operated until base closure in 1996. The Navy performed removal of sludge and residue and flushing of the entire IWTP collection system in 1996. An evaluation of the nature and extent, fate and transport, human health risk, and ecological risk was performed on the soil and groundwater data around IR14 in IA D1, as presented in the *Investigation Area D1 IR14 Technical Memorandum* (CH2M HILL 2003a). Conclusions from this evaluation indicate that no evidence of unacceptable risk to human or ecological receptors is posed by constituents at IR14 in IA D1. Pursuant to RCRA requirements, the pipeline will be inspected and flushed, if required, to ensure no waste remains in place. The pipeline will also be inspected for major breaks in the line and, if necessary, surrounding soils will be evaluated to determine if additional remedial action is required.

Group II/III sites were also identified as part of the IRP, based on a number of reports that documented environmental conditions at Mare Island. The only Group II/III site located within IA D1 is a portion of the sanitary sewer system, including sanitary sewer pipeline segments and two domestic pump stations (DOM-10 and DOM-18). No environmental concerns are associated with the sanitary sewer pipeline segments or either of the DOMs in IA D1, as presented in the *Sanitary Sewer Technical Memorandum* (CH2M HILL 2002b).

The UST and FOPL program at Mare Island included the identifying and removing USTs and FOPLs and performing abatement activities as necessary. Thirty-four USTs within IA D1 have been identified and investigated as part of the UST program. The USTs are documented in various reports consistent with the RWQCB Order. These reports include:

- *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b).
- *Sampling and Analysis Plan for Investigation Areas D1 and H2 Underground Storage Tanks*, hereafter referred to as the UST SAP (CH2M HILL 2002c).
- *Site Characterization Report for Investigation Area D1 Underground Storage Tank Sites*, hereafter referred to as the UST SCR (CH2M HILL 2003c).
- *Site Characterization Report Addendum: Interim Remedial Action Work Plan, Investigation Area D1 Underground Storage Tank Sites*, hereafter referred to as the UST IRA Work Plan (CH2M HILL 2003d).
- *Implementation Report and Request for Closure for Investigation Area D1 Underground Storage Tank Sites and Fuel-oil Pipeline Segments* (CH2M HILL pending).
- Site-specific closure letters prepared by both the Navy and CH2M HILL.

Twenty-nine UST sites in IA D1 have been investigated and/or remediated and require no further action. Request for closure letters proposing NFA have been submitted for these UST sites in accordance with RWQCB Order R2-2002-0105. Six UST sites were closed by the Navy (USTs 497, 563-A, 737, 898, 1230, and H-34), as approved by the RWQCB in 1995 (RWQCB 1995a-c). The UST SCR summarized the 2002 CH2M HILL investigations and concluded that 11 of the UST sites required NFA (UST Sites 84-Courtyard, 84-North, 201, 521, 563-1, 563-2, 563-3, 563-4, 886, H86, and S43-01) (CH2M HILL 2003c). CH2M HILL

submitted site-specific closure request letters for the remaining 12 UST sites (USTs 772, 84-NE, 1268, M52, H1, 1258, M45, 598, 338, 521 (OR-10), OR-15, and H5), consistent with the RWQCB Order following investigation and/or remediation activities. RWQCB requested additional investigation at UST OR-15. The additional investigation was completed and, subsequently, an interim remedial action was completed in accordance with the *Interim Remedial Action Work Plan for Underground Storage Tank OR-15* (CH2M HILL 2003e). The UST SCR proposed additional investigation and/or remediation at six UST sites (USTs H5, H74, M37, M51, M130, and OR-16). The additional actions at all but UST H5 are summarized in the UST IRA Work Plan (CH2M HILL 2003d). UST H5 did not require remedial action, and CH2M HILL submitted a site-specific closure request letter to the RWQCB. Additional investigation and/or remedial actions (soil removal activities) at the five UST sites and UST OR-15, consistent with the UST IRA Work Plan, are summarized in the *Implementation Report and Request for Closure for Investigation Area D1 Underground Storage Tank Sites and Fuel-oil Pipeline Segments* (CH2M HILL pending).

Thirty-nine FOPL segments (totaling approximately 15,400 feet) were identified and investigated within IA D1. Following historical records reviews, CH2M HILL prepared the *Sampling and Analysis Plan for the Fuel-oil Pipeline*, hereafter referred to as the FOPL SAP (CH2M HILL 2002d). The FOPL SAP outlined the investigation procedures for FOPL segments within the EETP, including the 39 FOPL segments in IA D1. Of these 39 FOPL segments, remedial action was proposed at 13 sites, consistent with the *Site Characterization Report/Interim Remedial Action Work Plan, Investigation Area D1 FOPL Segments*, hereafter referred to as the FOPL SCR/IRA Work Plan (CH2M HILL 2003f). Each segment was evaluated separately based on the findings of previous investigations, analytical results for soil and groundwater samples collected during implementation of the SAP, visual inspections during exploratory trenching, geophysical surveys, and other site-specific conditions. The conclusions and recommendations for remedial action for each FOPL segment within IA D1 are presented in the FOPL SCR/IRA Work Plan (CH2M HILL 2003f). The proposal for investigative and/or remedial action is specific to each FOPL segment and is based on site-specific conditions. Proposed remedial actions include vacuum testing, flushing and capping, pipeline excavation, and/or contaminated soil excavation. This work is being conducted under the direction of RWQCB in accordance with the RWQCB Order and is summarized in the *Implementation Report and Request for Closure for Investigation Area D1 Underground Storage Tank Sites and Fuel-oil Pipeline Segments* (CH2M HILL pending).

Twenty-six FOPL segments in IA D1 have been recommended for NFA based on the analytical data collected during previous investigations and during implementation of the SAP. The FOPL SCR/IRA Work Plan concludes that these 26 segments are not a threat to groundwater or surface water and present no significant risk to human health or the environment. In most cases, the FOPL segments have been removed, or passed a vacuum test, resulting in the removal or remediation of the source of potential soil and groundwater contamination. Therefore, these 26 FOPL segments are low-risk sites and are appropriate for permanent closure, as presented in the FOPL SCR/IRA Work Plan.

The Consent Agreement lists 74 PCB sites within IA D1; these PCB sites are identified by a building number and an Assessment Location (AL) number (LMI et al. 2001). Seven additional PCB sites were identified during review of the Navy documentation but were not listed in the Consent Agreement. These seven sites were identified as Unknown Locations

(ULs) in the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b). Therefore, there are 81 PCB sites within IA D1. Fifty-two of the PCB sites in IA D1 did not require additional cleanup action or implementation of a land-use covenant based on the results of the Supervisor of Shipbuilding, Conversion, and Repair, Portsmouth, Virginia, Environmental Detachment (SSPORTS) interim assessment sampling and Tetra Tech Environmental Management, Inc. (TtEMI) basewide confirmation sampling. CH2M HILL performed cleanup actions at PCB sites in IA D1 from October 2003 to April 2004. Sixty-two PCB sites do not require further remedial action, and site-specific closure requests have been submitted for these sites. Nineteen PCB sites in IA D1 require further remedial action that may include: land-use covenants, encapsulation, soil and concrete removal, and indoor air evaluation. Two of the sites are being encapsulated by existing transformers that will remain active for some time. In the event that the transformers are removed from service and/or a removal action is planned, a work plan will be submitted to DTSC presenting the approach to handling the PCB-impacted media.

Land-use covenants are necessary at 18 PCB sites in IA D1 pursuant to Section 67391.1 to Title 22, Division 4.5, Chapter 39 of the California Code of Regulations. Following agency review and approval of site closure with a land-use covenant, LMI will record the covenant, as appropriate, and provide a copy of the final recorded land-use covenant along with certification of recordation in Solano County.

ABM was periodically used across Mare Island for utility pipeline bedding material and as excavation backfill. ABM was identified in utility trenches and beneath the concrete foundations of the former residential buildings during the deconstruction activities in IA D1 at the former Farragut Coral Sea Villages. ABM removal and sampling activities were performed in accordance with the methods and procedures documented in the *Sampling and Analysis Plan for Abrasive Blast Material* (CH2M HILL 2003g). ABM encountered during the deconstruction efforts at the former Farragut and Coral Sea Villages has been excavated and properly disposed of off site, as documented in the *Final Technical Memorandum for Removal of Abrasive Blast Material in Soil at Former Coral Sea Village and Former Farragut Village* (CH2M HILL 2004a). From March through August 2003, 2,754 cubic yards of ABM from the former Farragut and Coral Sea Villages were transported to the Kettleman Hills waste disposal facility.

Residential structures have been the focus of several LBP and lead-in-soil surveys in IA D1. Surveys performed during 1995 and 1996 in residential areas of IA D1 (Farragut Village, the "Q" quarters along Azuar Drive, "Captain's Row," and other residential areas along Mesa Road and Cedar, Sargo, Wahoo, and Wawsmuth Avenues) concluded that LBP was present throughout the buildings inspected. DTSC has stated that all buildings must be evaluated for lead in soil at Mare Island. Therefore, additional characterization and remediation, where appropriate, is proposed for the remaining structures older than 1978 with painted surfaces and unpaved surrounding areas in IA D1. Applying the above criteria to existing structures in IA D1 results in 155 structures that require characterization. Depending on the results of the characterization, these 155 structures may be subject to remediation. The cleanup levels that are applied to the evaluation of the lead in soil consists of:

- Residential re-use areas: maximum average lead concentration for each yard (including the drip-line and mid-yard samples) is 210 mg/kg, and the maximum lead concentration for any sample is 400 mg/kg.

- Non-residential re-use area: maximum average lead concentration for each yard (including the drip-line and mid-yard samples) is 750 mg/kg, and the maximum lead concentration for any sample is 1,000 mg/kg.

In the case of non-residential areas, a land-use covenant precluding sensitive uses (residential, hospitals, or day care centers) will be recorded if the lead concentration is greater than the residential cleanup levels.

Remedial action has been performed in specific areas within IA D1 based on occupancy needs and deconstruction of structures. Two buildings in Touro University (Buildings 926 and 928) were characterized and remediated in 2003 to allow occupancy of Touro University students (MACTEC 2003). At the direction of DTSC, in 2002 and 2003, additional lead sampling was performed in the soil around structures in the former Farragut and Coral Sea Villages. Based on the results of those sampling events, excavation of lead-impacted soils was completed in the former Farragut and Coral Sea Villages, as summarized in the *Evaluation of Lead-based Paint in Soil at Former Coral Sea and Farragut Villages in IA D1 Deconstruction Area* (CH2M HILL 2004b). No further action is required with respect to LBP in soil in the areas where the previous remedial actions occurred around Buildings 926, 928, and the former Farragut and Coral Sea Villages.

Historically, pesticides and herbicides may have been used around residential and non-residential areas of IA D1. Chlordane application around the foundations of new buildings was standard practice until approximately 1987, when the Navy discontinued its use (Radian 1992). In June 2003, under the direction of DTSC, CH2M HILL performed sampling for pesticides in soil at 25 buildings within the former Coral Sea Village in accordance with *Final Generic Sampling and Analysis Work Plan for Evaluation of Lead-based Paint and Pesticides in Soil* (CH2M HILL 2003h) and *Sampling and Analysis Plan for Evaluation of Pesticides in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area* (CH2M HILL 2003i). The buildings sampled were selected based on the age, size, historical use, and type of the structures and included former residential and non-residential buildings within the proposed investigation area. Concentrations of gamma-chlordane and/or heptachlor exceeded the respective USEPA Region 9 residential preliminary remediation goals (PRGs) of 1.6 mg/kg and 0.11 mg/kg at four former buildings in the Coral Sea Village: Buildings 338, 1236, 1248, and 1254. Soil removal activities from areas around these four buildings, where concentrations of pesticides were detected above the USEPA Region 9 residential PRGs, are summarized in the *Evaluation of Pesticides in Soil at Former Coral Sea Village in IA D1 Deconstruction Area* (CH2M HILL 2004c). Analytical results from soil verification samples show that remaining pesticides concentrations in soil at the former Coral Sea Village do not exceed USEPA Region 9 residential PRGs.

In August 2002, as part of the investigation of former UST H74, black granular material was encountered during installation of monitoring well USTH74MW0101, located approximately 20 feet east of the southeast corner of Building H74. A sample of the black granular material was collected and the results showed elevated concentrations of total petroleum hydrocarbons (TPH)-diesel, TPH-motor-oil, and polynuclear aromatic hydrocarbons (PAHs). In August 2003, additional investigation of the black granular material was performed, as directed by DTSC. Seven borings were installed around monitoring well USTH74MW0101. Small amounts of black granular material mixed with silty sand were observed in two out of the seven of the borings. The soil sample results

showed detections of PAHs, TPH, Aroclor-1260, and metals. Only Aroclor-1260 and TPH-motor-oil were detected in one soil sample at concentrations that marginally exceed their respective screening criteria. One groundwater sample was collected from monitoring well USTH74MW0101 and analyzed for TPH, PAHs, metals, and PCBs. Metals were the only constituents detected above laboratory reporting limits. An evaluation of these results are presented in the *Investigation Area D1 Black Granular Material at Building H74 Technical Memorandum* (CH2M HILL 2003j). This technical memorandum requests an NFA determination based on the limited extent of the black granular material and that the results of the soil and groundwater evaluation suggest there is no significant impact to soil or groundwater. A screening-level risk assessment was performed on the data to verify that the NFA determination is protective of human health for an unrestricted land use. The results of this risk assessment were provided in the *Update to the Technical Memorandum for the Black Granular Material Near Building H74, Investigation Area* (CH2M HILL 2004d). As presented in this update, no further action is warranted.

The Navy addressed the nature and extent of potential unexploded ordnance (UXO) contamination at the former MINS, and the supplemental environmental baseline surveys indicated that no existing ordnance concerns exist within IA D1. Neither live explosive ordnance nor ordnance ingredients were manufactured in any of the buildings or the surrounding area within IA D1. The areas in IA D1 previously used for UXO storage and the former Old Rifle Range and Building M-37 Indoor Firing Range have been evaluated and do not require further investigation or action.

Radiological facilities at the former MINS were deactivated between 1994 and 1996, in accordance with basewide decommissioning plans. Both the Naval Nuclear Propulsion Program (NNPP) and General Radioactive Material (G-RAM) radiological decommissioning final reports were reviewed by the regulatory agencies following remediation activities (as necessary), and final documentation indicated that all final confirmation surveys and sampling results were below the identified action limits. As documented in letters to the Navy, the agencies have approved the reports and have agreed that the facilities in IA D1 are acceptable to release to the community for unrestricted use with respect to the NNPP and G-RAM program.

Other potential sources of environmental concern in IA D1, including the storm sewer system, oil/water separators, documented spills, hazardous waste accumulation areas, aboveground storage tanks, hazardous materials storage sites, grease and wash rack, and medical/biohazardous wastes, were evaluated in the *Investigation Area D1 Site Identification Technical Memorandum* and were not carried forward as sites of environmental concern (CH2M HILL 2003b). Therefore, no further investigation or action is required for these potential sources in IA D1. The sites and environmental issues in IA D1 that have been identified and evaluated have been either investigated and considered not to represent a significant risk to human health or the environment, are planned for remediation, or have been resolved to a level such that IA D1 no longer represents a significant risk to human health or the environment for the planned land use. The PCB, UST, and FOPL sites are being resolved under the authority of USEPA (for the PCB sites) and the RWQCB (for the UST and FOPL sites), in accordance with the respective orders. The completion of all investigation and/or remedial action at these additional sites, and submittal of the reports concluding that no further action is required at each of the sites, will be received and approved by

DTSC prior to issuance of certification for IA D1. Table ES-1 presents a summary of the proposed remedies for the sites in IA D1.

**TABLE ES-1**

Summary Proposed Remedies for CERCLA Sites IA D1

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Environmental Site</b>	<b>Proposed Remedy</b>
IR23 (UST 774)	No further action for unrestricted use
IR14 in IA D1	Inspection of pipeline for residual industrial waste subject to RCRA
Sanitary Sewer System in IA D1	No further action for unrestricted use
PCB Sites	No further action for unrestricted use; land-use covenants; encapsulation with land-use covenants; indoor air evaluations; and/or removal actions.
ABM – Former Farragut and Coral Sea Villages	No further action for unrestricted use
LBP – Former Farragut and Coral Sea Villages	No further action for unrestricted use
LBP – Buildings 926 and 928 Touro University	No further action for unrestricted use
LBP – Remaining Structures in IA D1	Surface soil removal action; protective barriers; and/or land-use covenants
Pesticides – Former Coral Seas Village	No further action for unrestricted use
Black Granular Material – Near Building H74	No further action for unrestricted use

# 1.0 Introduction

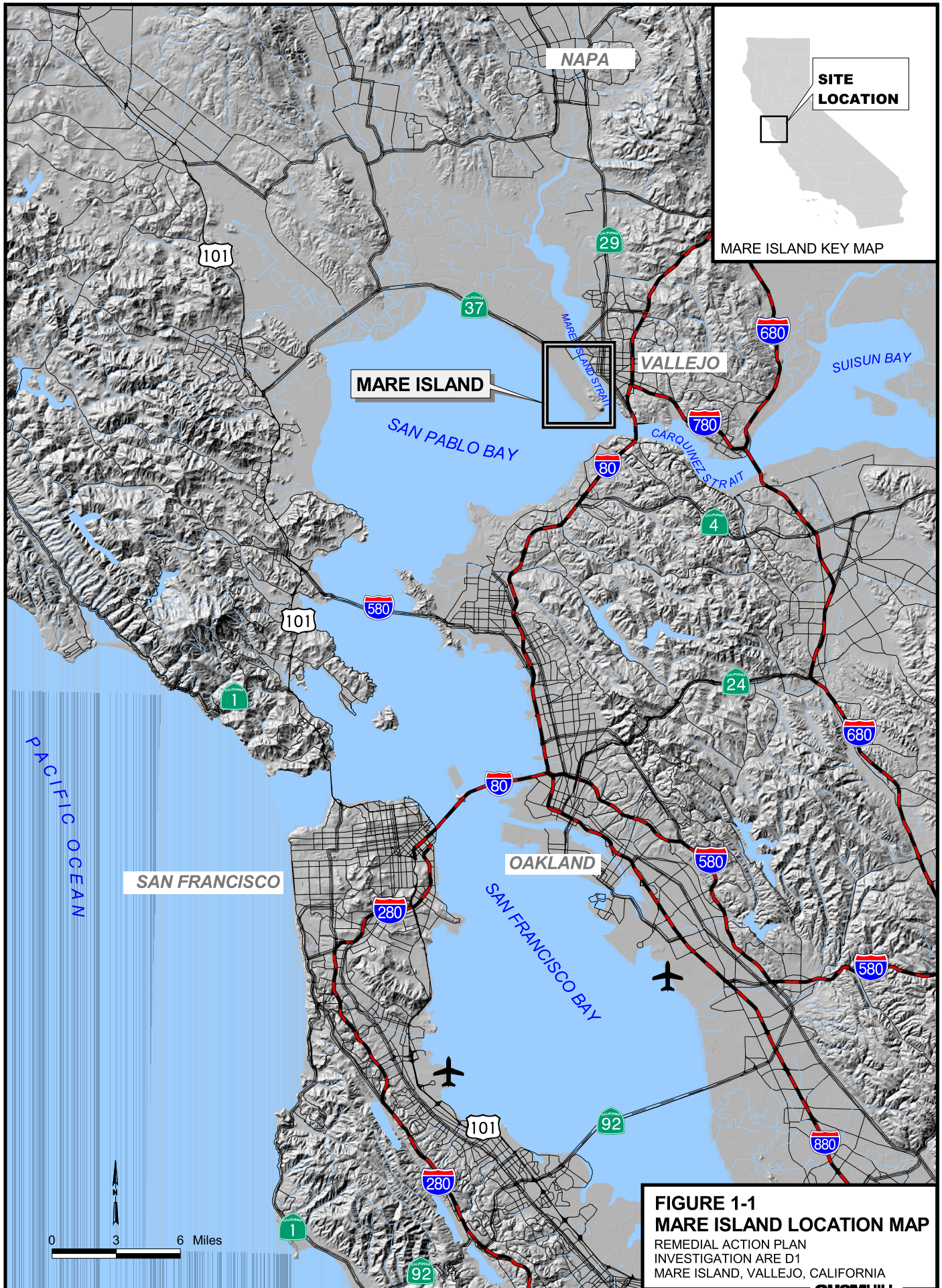
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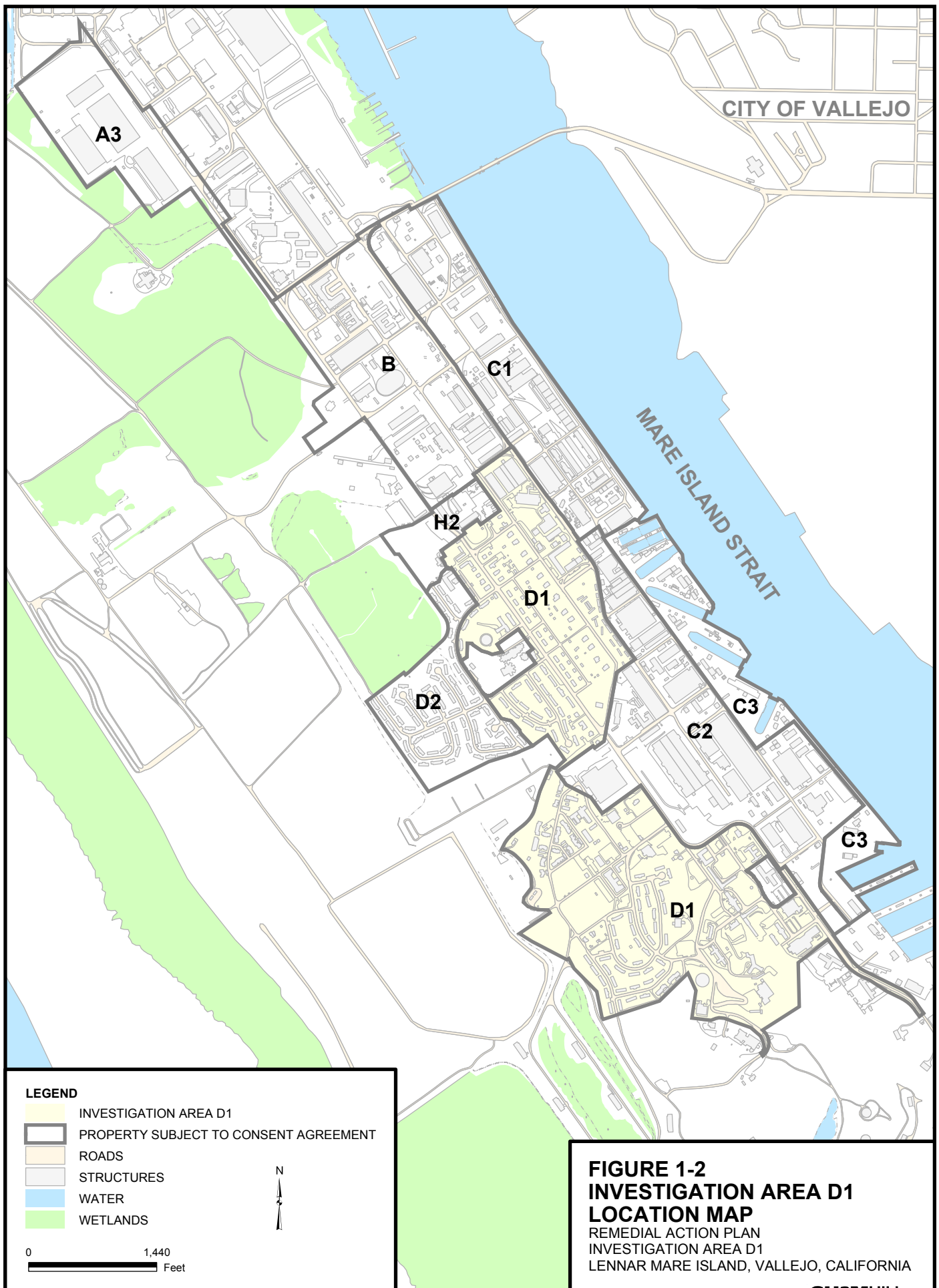
CH2M HILL prepared this remedial action plan (RAP) for Investigation Area (IA) D1 in accordance with the Consent Agreement (LMI et al. 2001) signed April 16, 2001 between Lennar Mare Island (LMI), the City of Vallejo, and the Department of Toxic Substances Control (DTSC). The information in this RAP related to the identification of sites of environmental concern is consistent with the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b).

The LMI property subject to the Consent Agreement (hereafter referred to as the Site) is shown on Figures 1-1 and 1-2. IA D1 is located in the central and southern areas of the property subject to the Consent Agreement, as presented in Figure 1-2. Past uses include military housing and barracks, community service and recreational facilities, medical facilities, prison facilities, offices, garages, storage/service buildings, and light industry. According to *Preliminary Land Use Plan* (LMI 2000), IA D1 is planned for largely residential and educational uses.

Previous environmental investigations conducted by the Department of the Navy (Navy) in IA D1 identified the potential presence of hazardous substances that require the preparation of a RAP and implementation of a remedy that complies with the National Contingency Plan. This RAP demonstrates that, within IA D1, the environmental concerns have been identified and, either have been resolved or are planned for remediation under the requirements of Chapter 6.8 of Division 20 of the Health and Safety Code, Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Consent Agreement, or are being resolved under the requirements of other regulatory programs. Specifically, the other programs are the underground storage tank (UST) and fuel-oil pipeline (FOPL) program, conducted pursuant to Regional Water Quality Control Board (RWQCB) Order R2-2002-0105 (RWQCB Order), and the polychlorinated biphenyl (PCB) program, conducted pursuant to the Consent Agreement and Final Order (CA/FO) between United States Environmental Protection Agency (USEPA) and the Navy, with the City of Vallejo and LMI as intervenors (USEPA et al. 2001). This RAP presents a summary of the environmental investigations and evaluations conducted and remedial actions planned and performed to date in IA D1. Additionally, this RAP presents the rationale for why no further physical remedial action is needed at specific sites to be protective of human health and the environment for the planned land use of IA D1.

Section 1.0 presents a brief overview of the contents of this document. Section 2.0 presents the site location, general description, and physical site conditions. Section 3.0 presents a summary of environmental investigations conducted at the former Mare Island Naval Shipyard (MINS) and presents findings of these investigations relative to IA D1. Section 4.0 presents the remedial alternatives and the recommended remedial actions at the sites in IA D1. Sections 5.0 through 7.0 present the works cited during the preparation of this RAP.





## 2.0 IA D1 Background and Description

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### 2.1 IA D1 Location and Description

The former MINS is located on Mare Island approximately 25 miles northeast of San Francisco, California, in Solano County on the western edge of the City of Vallejo (Figure 1-1). The island is currently a peninsula approximately 3.5 miles long and 1.25 miles wide (5,600 acres). When the Navy purchased Mare Island in 1853, the island consisted of approximately 1,000 acres of dry land and 300 acres of wetlands. Originally, Mare Island was a true island off the shore of Vallejo and was accessible only by ferry. The island was surrounded by low areas and tule marshes. In 1919, a wooden causeway with a drawbridge connected Mare Island to Vallejo. This wooden causeway was replaced in 1935 with the current concrete causeway.

IA D1 is located in the central and southern areas of the property subject to the Consent Agreement, as presented in Figure 1-2. LMI, the City of Vallejo, and DTSC have divided the property subject to the Consent Agreement into eight investigation areas, based on the Navy's previously-identified investigation areas and modified to accommodate LMI's planned reuse and development schedule. IA D1 encompasses approximately 231 acres and is bounded by 3<sup>rd</sup> Street, IA B, and IA H2 to the north; the Marine Corps Firing Range, dredge ponds, and former residential units (IA D2) to the west; Railroad Avenue and ship construction, repair, and berthing facilities (within IA C1 and IA C2) to the east; and a golf course to the south. According to *Preliminary Land Use Plan* (LMI 2000), IA D1 is planned for largely residential and educational uses. "Captain's Row" will be maintained as a historical core area that will be used for non-residential purposes.

### 2.2 IA D1 Land-use History

Historically, structures within IA D1 have been used as military housing and barracks, community service and recreational facilities, medical facilities, prison facilities, offices, garages, storage/service buildings, and light industrial purposes. Many of the structures within IA D1 lie within the Historic District Boundary, which qualified specific structures for listing in the *National Register of Historic Places*. Many of the structures in IA D1 have been deconstructed, including buildings that were located in the former Farragut and Coral Sea Villages. Approximately 200 structures remain in IA D1 with uses that include residential houses and garages, administrative offices, Touro University buildings, and community center areas. These structures are shown on Figures 2-1A and 2-1B. The land surrounding the buildings is mostly landscaped and unpaved. In addition, three recreational areas—Farragut Plaza, Chapel Park, and Alden Park—are located near the eastern boundaries of IA D1.

Deconstruction activities were performed in the former Farragut and Coral Sea Villages beginning in October 2002 and ending in November 2003. Approximately 89 structures were demolished, consisting of mostly former residential buildings. The deconstruction activities included removal of approximately 31,000 linear feet of subsurface utilities, removal of

concrete building foundations, sidewalks, asphalt roadways, and clearing and off-site disposal of vegetation (bushes, shrubs, and grasses). Environmental concerns encountered during the deconstruction activities included abrasive blast material (ABM), lead in soil derived from lead-based paint (LBP), and pesticides. These environmental conditions were managed during the deconstruction activities in accordance with the requirements of the regulatory agencies and/or approved work plans as discussed later in this RAP (Sections 3.2.5.1, 3.2.5.2, and 3.2.5.3, respectively).

## 2.3 IA D1 Physical Characteristics

The following subsections describe the topography, hydrology, geology, hydrogeology, and ecological features in IA D1.

### 2.3.1 Topography/Hydrology

IA D1 is one of the largest investigation areas on Mare Island, and the largest topographic relief on Mare Island occurs within IA D1. The southern portion of IA D1 contains an outcrop of bedrock that reaches an elevation of 125 feet above mean sea level (msl); the lowest parts of IA D1 occur to the west of UST 772 at an elevation of about 15 feet msl. IA D1 contains numerous structures and surrounding landscaped areas. Three recreational areas are located along the eastern boundaries of IA D1.

Surface water drainage within IA D1 infiltrates into the subsurface or is controlled by the stormwater system. In areas of pavement and buildings, rainwater runoff flows to stormwater drains and is discharged into Mare Island Strait northeast of IA D1. However, in other areas runoff may infiltrate into the subsurface or evaporate in areas where ponding occurs. The 100-year floodplain extends 0.5 mile inland from the northwest marshes, and the flat, low-lying regions of Mare Island are subject to flooding.

### 2.3.2 Geology

The geology of Mare Island can be characterized as an eroded bedrock surface that is exposed in the southern part of the peninsula, overlain by a blanket of unconsolidated Quaternary sediments and artificial fill material at most other locations. The bedrock surface is irregular and deeply incised in some areas, and up to 160 feet of unconsolidated materials overlie the bedrock at some locations on the peninsula. The eroded bedrock forms a subsurface ridge, estimated to be the original extent of Mare Island in 1869, that extends northwest along the axis of the Mare Island peninsula, roughly coinciding with Azuar Drive. The northern extent of the subsurface bedrock ridge is not known, but the ridge is present at least as far north as A Street.

Three principal geologic units were identified at Mare Island. From top to bottom stratigraphically, these units include fill material, unconsolidated natural deposits, and bedrock. The fill material is a heterogeneous unit consisting of clay, silt, sand, gravel, and debris in varying proportions. The unconsolidated natural deposits consist primarily of a thick sequence of silty clays (commonly referred to as “Younger Bay Mud”) and intermediate and lower sand units of the San Antonio Formation. The bedrock consists of sandstone, siltstone, and shale.

### 2.3.2.1 Fill

Because of extensive land reclamation activities at Mare Island, a highly heterogeneous surficial layer of fill material is prevalent at locations outside of the original outline of the island. The fill material consists of silty clays, sands, gravels, organic debris, debris including concrete, asphalt, brick, metal, timber, paint chips, fiberglass, and other solid refuse and is characterized by abrupt and unpredictable changes in material in short lateral and vertical distances.

Most of IA D1 is within the original (pre-1869) Mare Island boundary and is not underlain by a substantial thickness of fill. Small areas of fill may be present along the east boundary of IA D1 near the firing range.

### 2.3.2.2 Unconsolidated Natural Deposits

Unconsolidated natural deposits overlie the eroded bedrock surface on much of Mare Island. The composition of unconsolidated natural deposits on the western side of the bedrock ridge differs from the eastern side deposits. IA D1 straddles the ridge.

On the western side of the bedrock ridge, natural deposits consist of an upper silty clay, an intermediate sand, a lower silty clay, and a thick lower sand unit that is inferred to rest directly on the eroded bedrock surface. East of the bedrock ridge (the industrial areas of Mare Island), unconsolidated natural deposits consist primarily of silty clay and clay, with occasional discontinuous lenses of silty sand and sandy clay. The unconsolidated materials vary from as little as 5 feet thick on top of the bedrock ridge to more than 105 feet thick near the southern end of the peninsula.

### 2.3.2.3 Bedrock

The bedrock at Mare Island consists of steeply-dipping brown, orange, and tan arkosic sandstone, siltstone, and micaceous shale. Bedrock outcrops exist in the hilly area at the southern end of the peninsula (located partially within D1) that is now occupied by the golf course, ammunition bunkers, and a residential area along Mesa Avenue. The exposed bedrock at Mare Island is assigned to the undifferentiated Great Valley Sequence on Wagner and Bortungo's (1982) regional geologic map. A more detailed map prepared by Dibblee (1981) identifies the bedrock as arkosic sandstone and micaceous shale of the Cretaceous Panoche Formation.

## 2.3.3 Hydrogeology

One water-bearing zone (shallow) was identified at Mare Island. The shallow water-bearing zone (SWBZ) refers to both artificial fill and the upper silty clay that are intersected by the water table. A single unconfined aquifer underlies IA D1. Based on groundwater elevations measured during quarterly groundwater sampling events, groundwater flow in the SWBZ is regionally influenced by the area of the original Mare Island, the area of the landfill, the wetlands to the west, and the adjacent dredge pond south of the landfill. Localized groundwater flow in the SWBZ is strongly influenced by variations in lithology across the island. The SWBZ includes both coarse-grained materials that act as preferential flow pathways, and fine-grained materials, which tend to impede groundwater flow. Because of mixed lithologies and the heterogeneous nature of the SWBZ, groundwater flow direction and velocity will vary in response to specific site conditions.

Fourteen monitoring wells are located in IA D1, as shown in Figures 2-1A and 2-1B. Wells in IA D1 are screened in the SWBZ, as are the majority of the wells located on Mare Island. Depth to groundwater in the few wells located in and near IA D1 range from as little as 3.4 feet below ground surface (bgs) (23W02 in 1993) to 23.62 feet bgs (BGW03 in 2000). Groundwater levels in most wells on Mare Island vary seasonally, with highest levels occurring in the spring following the wet season and lowest levels occurring in late summer. Because IA D1 is inland, tidal influence is not expected. Groundwater in the west part of IA D1 flows to the west and southwest; in the eastern part of IA D1, groundwater flows to the east and northeast.

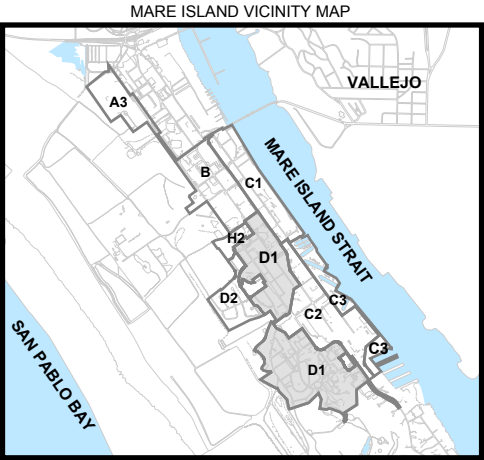
Groundwater at Mare Island is neither currently, nor historically, used for domestic, agricultural, or industrial water supply. The technical memorandum *Assessment of the Municipal and Domestic Supply (MUN) Beneficial Use Designation for the Eastern Early Transfer Parcel* (CH2M HILL 2003k) evaluates the potential for groundwater beneath the Eastern Early Transfer Parcel (EETP) at Mare Island to be used for municipal and domestic water supply and concluded that the Mare Island groundwater is not a potential source of drinking water.

### 2.3.4 Ecological Features

Major habitat types found at or around Mare Island include intertidal mudflats and open water, tidal wetlands, non-tidal wetlands, active dredge ponds, and uplands. These habitat types are described in detail in the ecological risk assessments for onshore and offshore areas of Mare Island (TtEMI 2000a, 2001).

The offshore areas of Mare Island consist of habitat below the mean high-tide line and generally include intertidal mudflats and open water. IA D1 is not immediately adjacent to any of these offshore habitats surrounding Mare Island. IA D1 is not immediately adjacent to any offshore habitats. IA D1 is landlocked and surrounded by IA H2, IA B, IA C1, IA C2, IA D2, wetlands, dredge ponds, a golf course, and firing range.

IA D1 is occupied by scattered structures surrounded by landscaped areas with several open recreation areas located in the southern portion of the site. The level of land disturbance and urban development preclude the presence of a viable ecological habitat.



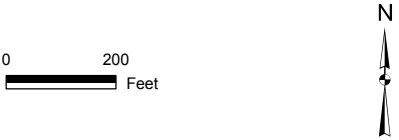
**LEGEND**

⊕ MONITORING WELL

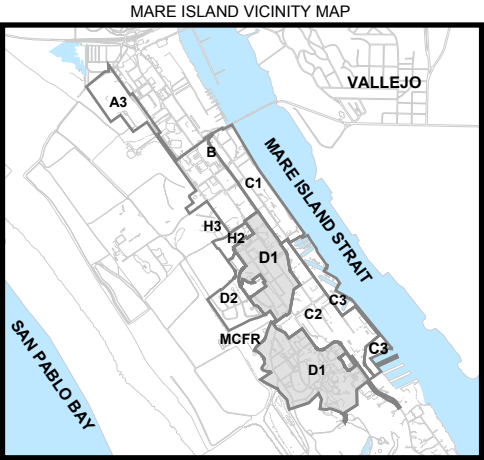
--- INVESTIGATION AREA

**NOTES:**

1. AERIAL PHOTO YEAR - 2000



**FIGURE 2-1A**  
**INVESTIGATION AREA D1**  
**NORTH SITE MAP**  
REMEDIAL ACTION PLAN  
INVESTIGATION AREA D1  
LENNAR MARE ISLAND, VALLEJO, CALIFORNIA



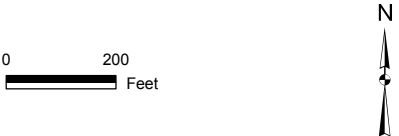
**LEGEND**

⊕ MONITORING WELL

--- INVESTIGATION AREA

**NOTES:**

1. AERIAL PHOTO YEAR - 2000



**FIGURE 2-1B**  
**INVESTIGATION AREA D1**  
**SOUTH SITE MAP**  
REMEDIAL ACTION PLAN  
INVESTIGATION AREA D1  
MARE ISLAND, VALLEJO CALIFORNIA

## 3.0 Summary of Investigations

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Environmental conditions at the former MINS have been described in a number of previous reports. The primary focus of the initial studies was aimed at characterizing soil and groundwater conditions and maintaining environmental compliance programs. These investigation programs were developed in conjunction with the Federal Facilities Site Remediation Agreement, the Comprehensive Long-term Environmental Action Navy contracts, and input from the USEPA, the DTSC, and RWQCB.

Section 3.1 presents an overview of the various environmental programs and investigations, and Section 3.2 discusses the specific findings of those programs and investigations that identified, evaluated, and addressed environmental concerns in IA D1.

### 3.1 Environmental Programs and Investigations

#### 3.1.1 Installation Restoration Program

The Navy initiated an Installation Restoration Program (IRP) at Mare Island in 1981. The purpose of the IRP was to evaluate public health and environmental risks associated with MINS' historical operations and waste disposal activities. The IRP work performed over the past 20 years has consisted of preliminary assessments to identify sites of environmental concern, remedial investigations, feasibility studies, and removal actions. This work was performed in multiple phases by multiple contractors. Primarily because of the sequencing of the phases of work, the environmental sites were subclassified as either Group I or Group II/III sites.

##### 3.1.1.1 Group I Sites

The Group I IRP sites were identified through basewide reviews of historical operations at the MINS in the Initial Assessment Study (IAS) and subsequent studies. The purpose of the IAS was to identify environmental contamination resulting from past hazardous materials operations at the former MINS through the evaluation of personal interviews, field inspections, and reviews of historical records and aerial photographs (Ecology and Environment, Inc. 1983). The IAS, completed in 1983, identified 14 potentially-contaminated sites. A subsequent verification study was completed in January 1987 that included the collection of environmental samples. The results of the verification study indicated that additional site characterization was necessary at all study sites (Richesin and Associates et al. 1987). Subsequently, the Navy and regulatory agencies identified additional sites, bringing the total of Group I sites included in the IRP to 24. The Group I sites were originally subdivided into three operable units for the purposes of the remedial investigation. Phase I of the remedial investigation – the site characterization summary – was conducted between 1990 and 1992 (IT 1992). The Phase I remedial investigation included collecting environmental samples at 19 Group I IRP sites, with the remaining five sites addressed separately. A separate lead-oxide study was performed in lieu of a Phase I remedial investigation at two IRP sites (PRC 1992). Phase II of the remedial investigation

occurred between 1993 and 1996 and included additional environmental sampling at all of the Group I sites.

Of the 24 Group I sites, 17 are located within the property subject to the Consent Agreement. Two Group I sites (IR23 and a portion of IR14) are located within IA D1. These sites are discussed in Sections 3.2.1.1 and 3.2.1.2.

#### 3.1.1.2 Group II/III Sites

The Group II/III IRP sites were created from a number of other reports that documented environmental conditions at MINS. In 1987, the USEPA prepared a Resource Conservation and Recovery Act (RCRA) Facility Assessment Preliminary Review of solid waste management units (SWMUs), which included a records review of the former shipyard operations to identify previously-unregulated releases of hazardous constituents. The report documented 95 SWMUs, 11 potential SWMUs, and four areas of concern (Kearny 1987). The SWMUs, potential SWMUs, and areas of concern are considered Group II sites and include shops associated with shipyard operations, USTs, previously-identified IRP sites, ordnance sites, radiological sites, and wastewater system conveyance and treatment structures. An additional 19 sites were added by the regulatory agencies and the Restoration Advisory Board as uninvestigated areas of possible contamination and were identified as Group III sites.

The 129 sites were subject to further evaluation through preliminary assessment/site inspections (PA/SIs) and were divided into radiological sites, non-radiological sites, and ordnance sites. The PA/SI process involved employee interviews, site visits, historical records research, and sample collection at specified sites. A PA/SI final summary report for the non-radiological sites, completed in 1995, concluded that 24 of the 129 sites required further investigation under the Navy IRP (PRC 1995). Two of the 24 sites were eliminated after further discussions between the Navy and the regulatory agencies. The 22 sites for additional investigation were designated Group II/III sites and described in the *Group II and III Accelerated Study Field Sampling and Analysis Plan* (PRC 1997b). The Group II/III investigation occurred between 1997 and 1999.

Fourteen of the Group II/III sites are located within the property subject to the Consent Agreement. The only Group II/III site located within IA D1 consists of segments of the sanitary sewer pipeline and two domestic pump stations (DOM-10 and DOM-18). The sanitary sewer system in IA D1 is discussed further in Section 3.2.1.3.

### 3.1.2 Underground Storage Tank and Fuel Oil Pipeline Program

The UST/FOPL program is being conducted pursuant to the RWQCB Order but has been included in this RAP for completeness.

The UST/FOPL program includes identifying and removing USTs and FOPLs and performing abatement activities as necessary. Documentation of the UST site assessment, sampling, and abatement activities is contained in reports specific to certain UST sites. The Navy tasked the Supervisor of Shipbuilding, Conversion and Repair, Portsmouth, Virginia, Environmental Detachment (SSPORTS) with executing UST removal activities and removing or abandoning the FOPL at Mare Island as part of MINS closure. When SSPORTS

was dissolved in September 1999, the Navy contracted with Roy F. Weston, Inc. (Weston) to finish the FOPL remediation work.

During the years that Mare Island was used as a shipyard, the Navy used numerous USTs. Some USTs at Mare Island date back to the early 1900s. These USTs were used primarily for oil-fired, steam-driven machinery and to store heating oil for steam-heat boilers. Many of the USTs became obsolete as the central steam and natural gas systems replaced the need for oil burners. UST sites were identified through a review of available historical plans, drawings, written documentation, and visual surveys. According to the *Underground Storage Tank Summary Data Report, Revision I* (SSPORTS 1999a), 152 UST sites have existed at Mare Island. The Navy states that 80 of these USTs have not been located (referred to as suspect UST sites); there was no evidence of these suspect USTs after site investigation (magnetic surveys, probes, and soft digs). Sixty-seven USTs have been removed, and five USTs have been closed in place. The Navy received closure letters from the RWQCB for 19 of the UST sites at Mare Island.

Twenty-six UST sites within IA D1 have been identified and investigated as part of the Navy UST program. In addition, evidence of another eight potential UST sites have been identified in IA D1 after review of Navy records and historical maps. Section 3.2.2 provides a detailed description of the 34 IA D1 UST sites that were identified as sites of environmental concern.

The FOPL distribution system was used to transport fuel oil across the former MINS between underground and aboveground storage tanks (ASTs), buildings, and work areas. Additionally, FOPL segments extended to the Mare Island Strait for conveyance of fuel oil between ships and the former MINS. The pipeline segments were generally abandoned in place when boilers were converted to natural gas or older buildings demolished; however, detailed records of the FOPL status were not maintained. FOPL segments were identified through a review of available historical plans, drawings, written documentation of previous investigations, and visual surveys. An estimated 51,000 linear feet of FOPL have been installed at MINS over a period of approximately 90 years. Approximately 49,000 feet of FOPL are located within the EETP. The remaining 2,000 feet of FOPL are located outside of the EETP in the vicinity of Mare Island Elementary School and Building 1294. Approximately 15,400 feet of the FOPL are located within IA D1. Of the approximately 49,000 linear feet of FOPL located in the EETP, approximately 19,000 feet of pipeline have been removed; 8,000 feet of pipeline have been flushed and capped; and 6,000 feet of pipeline have been abandoned in place during previous investigations. An additional 16,000 feet of pipeline have not been located. The FOPL segments in IA D1 are discussed in Section 3.2.3.

### 3.1.3 PCB Program

The PCB program is being conducted pursuant to the USEPA CA/FO (USEPA et al. 2001) but has been included in this RAP for completeness.

The PCB program at MINS included identifying, retrofitting, and removing PCB-contaminated equipment, assessing locations of potential releases of PCBs, and performing abatement activities as necessary. From visual site surveys, as well as from review of historical records, building closure reports, and databases of electrical equipment,

the Navy identified PCB sites where PCB-containing equipment was located, where PCB spills were documented, or where contamination was suspected because of building history or visible stains (TtEMI 1998). Navy personnel from SSPTS conducted interim PCB assessments and performed cleanup actions (i.e., washing, scabbling, excavation) in accordance with Technical Work Documents (TWDs), where necessary. Following the SSPTS interim PCB assessments and any necessary cleanup actions, Tetra Tech Environmental Management, Inc. (TtEMI) personnel collected confirmation samples either to confirm SSPTS findings that no cleanup was necessary or to determine the effectiveness of the SSPTS cleanup actions. Documentation of the PCB site assessment, sampling, and cleanup actions is contained in the *Final Basewide Polychlorinated Biphenyl Confirmation Sampling Report* (TtEMI 1998).

The Consent Agreement lists 74 PCB sites within IA D1; these PCB sites are identified by a building number and an Assessment Location (AL) number (LMI et al. 2001). Seven additional PCB sites were identified during review of the Navy documentation but were not listed in the Consent Agreement. These seven sites were identified as Unknown Locations (ULs) in the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b). Therefore, there are 81 PCB sites within IA D1. The PCB sites in IA D1 are discussed further in Section 3.2.4.

### 3.1.4 Additional Investigation Programs

In addition to the IRP and the UST and PCB programs, other environmental programs have been implemented at the former MINS that have evaluated potentially-contaminated areas or have identified other environmental concerns. These programs have included surveys performed in accordance with the Community Environmental Response Facilitation Act (CERFA) in anticipation of real property transfer and the ongoing environmental compliance programs at MINS, as presented in the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b).

CERFA requires the identification of contaminated and uncontaminated real property at Base Realignment and Closure (BRAC) sites. To meet the requirements of CERFA, the Navy began preparing an Environmental Baseline Survey (EBS) in 1993 to document the existing environmental condition of real property at the former MINS. The EBS report (MINS 1994) is based on information obtained through an extensive records search, personnel interviews, and visual site inspections of each building and facility conducted from August through December 1993. Records reviewed encompassed available Navy and regulatory agency records, which included environmental restoration and compliance reports, audits, permits, surveys and inspections; an analysis of aerial photographs, utility systems, and historical shipyard drawings and maps; and a review of available recorded chain-of-title, deeds, and other real property records for MINS. The survey was designed to identify, where possible, the potential for past and present site contamination by identifying the type, quantity, and instances of hazardous substance storage, release, or disposal.

As defined in the Basewide EBS, MINS was divided into 125 EBS parcels to improve control and evaluation of individual areas to be leased. These parcels were then grouped into zones. Subsequent to the Basewide EBS, the Navy prepared Supplemental EBS reports that provided specific details of the environmental conditions of the properties within each zone. The Supplemental EBSs for Zone 03 (SSPTS 1996a), Zone 04 (SSPTS 1996b), Zone 05

(SSPORTS 1996c), Zone 06 (SSPORTS 1999b), Parcel 07-A2 (SSPORTS 1998a), Zone 08 (SSPORTS 1997a), and Zone 09 (SPORTS 1996d) – zones that are all located at least partially within IA D1 – updated the information for the various environmental restoration and compliance programs gathered for the original Baseline EBS. New record reviews and visual site inspections were also performed. The Supplemental EBSs also included an assessment of the significant data collected for parcels adjacent to and contiguous to each zone that could pose environmental concerns.

From information provided in the Baseline EBS, Supplemental EBSs, the BRAC plan (MINS 1995), and the National Environmental Policy Act Categorical Exclusion for the Proposed Interim Lease, the Navy prepared Findings of Suitability to Lease (FOSL) for several of the zones that comprise IA D1. The purpose of the FOSL was to document environmental factors regarding the proposed lease of properties or areas in MINS. Properties identified in the FOSL as not suitable for immediate occupancy were subject to post-supplemental EBS surveys, including completing additional visual site inspections and updating information that addressed unresolved issues from the Supplemental EBS, as documented in Lease Restriction Revisions.

A BRAC Cleanup Team for Mare Island was formed with representatives from the Navy, California EPA, and USEPA. Consultation with the regulatory agencies was an integral part of preparing the FOSL and Finding of Suitability to Transfer documents. Regulatory comments received during the development of the documents were reviewed and incorporated as appropriate. Throughout this process (approximately the same time that the PA/SI studies were being completed and the scope of the Group II and III investigation was determined), the results of the EBS work were being reviewed by the Navy and regulatory agencies to identify potentially-contaminated areas that may be appropriate for inclusion in the IRP as Group II/III sites, as discussed in Section 3.1.1.2. Furthermore, the results of the EBS work were being reviewed to confirm the results of previous historical research at the former MINS and to identify additional sites for inclusion in the UST and PCB programs (discussed in Sections 3.1.2 and 3.1.3, respectively).

Environmental compliance programs and other basewide screening programs have evaluated the potential for site contamination. Surveys and investigations, including sampling and analysis of media of concern, have been performed as appropriate for the following environmental compliance programs:

- Unexploded ordnance (UXO)
- Radioactive materials
- Basewide groundwater monitoring
- RCRA-permitted facilities

The first three of the above-listed programs were instituted basewide; the program findings in IA D1 are discussed in detail in the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b) and briefly in the section below. No buildings or surrounding areas within IA D1 were identified as former RCRA-permitted facilities. The *Investigation Area D1 Site Identification Technical Memorandum* concluded that the UXO, radioactive materials, and the basewide groundwater monitoring programs, as they related to IA D1, did not identify any sites that needed to be carried forward as sites of environmental concern (CH2M HILL 2003b).

### 3.1.4.1 UXO

Neither live explosive ordnance nor ordnance ingredients were manufactured in any of the buildings and surrounding area within IA D1. Portions of three small-arms ranges historically have existed within IA D1, including the former Old Rifle Range, Building M-170, and Building M-37 Indoor Firing Range. These areas have been investigated and either were found not to require further action or have been remediated. Many additional buildings within IA D1, largely officers quarters, may have stored ordnance in the past. Navy ordnance surveys have established that ordnance is not present at these sites and that additional action regarding past storage of UXO at these locations is not warranted (SSPORTS 1996d, 1999b). The Supplemental EBSs indicate that no ordnance concerns exist within IA D1. The areas in IA D1 used previously for UXO storage and the former Old Rifle Range, Building M-170, and Building M-37 Indoor Firing Range do not require additional remedial action (CH2M HILL 2003b).

### 3.1.4.2 Radiological Program

Radiological facilities at the former MINS were deactivated between 1994 and 1996 in accordance with basewide decommissioning plans. Decommission activities were conducted under both the Naval Nuclear Propulsion Program (NNPP) and the General Radioactive Material (G-RAM) Program. Extensive surveys with sensitive instruments were performed over areas where radioactive material had been used, handled, stored, or transported. A rigorous quality assurance program was implemented to ensure the validity of the survey data obtained. Areas that reported low-level radioactivity in excess of permissible limits were remediated and resurveyed for unrestricted use.

Areas of potential radiological concern within IA D1 are listed in Table 3-1.

TABLE 3-1  
Radiological Decommissioning Program in IA D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

IA D1 Facility	Radiological Survey Classification	Radiological Concern
84	(G)	Janitorial area containing potential radioactive material
201	G	Radiological Detection Laboratory
253	G	Direct Material Storage/Inventory Storehouse housing a fluoroscope unit
417	G	Radiological Equipment Storage Area
497	G	Industrial Medical Dispensary containing the Radiochemistry Laboratory
521	(G)	Shipyard Administrative Offices housing radiation detection instruments
737	(G)	Office housing radioactive material
764	(G)	Dental clinic containing radium-painted dials
1230	(G)	Combat System Training Facility containing radioactive material
H-1	(G)	Hospital potentially containing radioisotopes
H-70	(G)	Storage area containing radium-contaminated items

**TABLE 3-1**  
Radiological Decommissioning Program in IA D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>IA D1 Facility</b>	<b>Radiological Survey Classification</b>	<b>Radiological Concern</b>
H-73	(G)	Combat Systems Technical Schools Command containing radioactive material
H-74	(G)	Combat Systems Technical Schools Command containing radioactive material

Notes:

G = Radiological Survey performed under the G-RAM Program based on past history of use.

(G) = Radiological Survey performed under G-RAM Program as added measure of precaution but no history of radiological use.

The DTSC and USEPA provided ongoing review and quality assurance oversight through the radiological decommissioning program. Both the NNPP and G-RAM radiological decommissioning final reports were reviewed by these agencies following remediation activities (as necessary), and final documentation indicated that all final confirmation surveys and sampling results were below the identified action limits.

As documented in letters to the Navy, the agencies have approved the reports and have agreed that the facilities in IA D1 are acceptable to release to the community for unrestricted use with respect to the NNPP and G-RAM program (DTSC 1996, 1997; USEPA 1996; MINS 1996a-i). The areas of past radiological material use and storage in IA D1 are no longer sites of environmental concern, and no further action (NFA) is required at these sites (CH2M HILL 2003b).

### 3.1.4.3 Basewide Groundwater Monitoring Program

In 1992, the Navy initiated a basewide quarterly groundwater monitoring program at previously-installed monitoring wells at Mare Island. The 14 monitoring wells installed to date within IA D1 have been used to provide site characterization data around existing sites of environmental concern. No additional sites of environmental concern were associated with the basewide groundwater monitoring program in IA D1 (CH2M HILL 2003b).

In addition to the programs listed above, other potential sources of contamination were evaluated in IA D1, including:

- ABM
- LBP in soil
- Pesticides/herbicides
- Storm sewer system
- Documented spills
- Hazardous waste management/hazardous materials management
- Oil/water separators
- ASTs
- Grease and wash rack
- Medical/biohazardous wastes

ABM, LBP, and pesticides are discussed in this RAP (Sections 3.2.5.1, 3.2.5.2, and 3.2.5.3, respectively), as additional investigation and/or remediation has occurred since preparation of the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b).

The *Investigation Area D1 Site Identification Technical Memorandum* concluded that the remaining potential sources of contamination in IA D1 listed above (storm sewer system, documented spills, hazardous waste accumulation areas, hazardous material storage sites, oil/water separators, ASTs, grease and wash rack, and medical/biohazardous wastes) did not need to be carried forward as sites of environmental concern (CH2M HILL 2003b). Regarding these potential sources of contamination, no further action is required in IA D1.

## 3.2 Investigation Findings

This section presents the results of the various investigation programs conducted at the former MINS as they pertain to the identification, evaluation, and response action at environmental sites in IA D1.

### 3.2.1 Installation Restoration Program Sites

There are two IRP Group I environmental sites (IR23 and a portion of IR14) and one Group II/III environmental site (sanitary sewer system) located in IA D1. The locations of the IRP sites are shown on Figure 3-1.

#### 3.2.1.1 IR23

IR23 includes the former (partially-buried) fuel storage Tank 772 and associated subsurface piping west of Azuar Drive (formerly Cedar Avenue) between Tisdale Avenue and 9<sup>th</sup> Street in the central portion of MINS. From 1942 to 1994, Tank 772 was used for auxiliary storage of fuel oil for the central steam power plant (Building 121). Tank 772 was cast in place and constructed of reinforced concrete. The base of the 20-foot-high, 2.1-million-gallon tank was about 9 feet below grade and partially buried. Piping from Tank 772 ran east from the tank through Building 748 to Berth 10, with a connection in between to Building 121.

In 1979, a hairline fracture was discovered along the upper-third sidewall of Tank 772. The fracture is referenced as having been “concentrated in the westerly and southerly quadrants with isolated leaks in other quadrants” (IT 1988). Oil-saturated soil was encountered at 6 to 12 feet bgs, and an estimated 1,000 gallons of fuel oil were released over time. Repairs were performed in 1982 and 1983 and included construction of a new leakage collection sump in the pump house adjacent to the tank (PRC 1997a).

Elevated levels of total petroleum hydrocarbons (TPH) were detected in the immediate vicinity of Tank 772 during Phase I and II of the remedial investigation. Twelve soil and four groundwater samples were collected at IR23 during Phase I, and 246 soil and six groundwater samples were collected during Phase II. Gasoline-range petroleum hydrocarbons (TPH-gasoline) were detected up to 32,000 milligrams per kilogram (mg/kg) in the eight soil borings immediately surrounding the location of former UST 772. Diesel-range hydrocarbons (TPH-diesel) were detected up to 25,000 mg/kg in soils adjacent to UST 772. Elevated levels of motor-oil-range hydrocarbons (TPH-motor-oil) were detected in soil along the FOPL (up to 5,300 mg/kg).

Five monitoring wells are located within the boundaries of IR23 (23W01 through 23W04 and 23W10). Petroleum hydrocarbons have been detected inconsistently and at relatively low concentrations in groundwater from the monitoring wells in IR23. During Phase I of the remedial investigation, TPH-diesel/motor-oil concentrations in groundwater samples collected from 23W01 through 23W04 ranged from non-detect to 5.88 milligrams per liter (mg/L). TPH-diesel/motor-oil concentrations in groundwater samples collected from 23W08 and 23W09 (located outside IA D1 boundaries, south of IR23) were 0.07 and 0.1 mg/L, respectively, during Phase II of the remedial investigation (PRC 1997a).

Tank 772 was demolished and removed in 1997. The tank floor and approximately 2 feet of the wall were not demolished and remained in place, covered with approximately 7 feet of clean fill. Petroleum hydrocarbon staining in soil was recorded during UST removal. Confirmation sampling was performed at 32 locations around the perimeter of the removed tank and at 10 locations below the tank floor. The soil samples were analyzed for TPH-diesel, TPH-fuel-oil, and benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. TPH-diesel was detected in four of 42 samples analyzed, with a maximum detected concentration of 124 mg/kg. TPH-fuel-oil was detected in 13 of 42 samples analyzed, with a maximum detected concentration of 3,740 mg/kg. BTEX compounds were not detected during confirmation sampling. Six hundred pounds of oxygen-releasing compound were distributed into the excavation prior to backfilling to enhance biodegradation of the petroleum hydrocarbons (SSPORTS 1998b).

The removal action in 1997 was successful in removing the primary source of TPH and significantly reducing impacts to groundwater. Additional groundwater sampling and analysis was performed in 1998 and 1999 to support site closure and have adequately characterized groundwater around Tank 772. Samples were collected from 23W01 through 23W04 and from a newly-installed well, 23W10. Benzene, ethylbenzene, methyl tributyl ethylene (MTBE), TPH-motor-oil, and TPH-fuel-oil were not detected in any of the groundwater samples. TPH-diesel, toluene, and xylenes were detected at maximum concentrations of 0.08 mg/L, 0.5 mg/L, and 1 microgram per liter (µg/L), respectively. Petroleum hydrocarbons were not detected in any of these wells during the July 1999 sampling event, which demonstrated that the TPH contamination in the Tank 772 vicinity has not resulted in any significant impact to groundwater (TtEMI 2000b).

Both SSPORTS (1998b) and TtEMI (2000b) prepared requests for regulatory closure of IR23 based on the extensive soil and groundwater data collected at the site. However, there was concern that the remaining tank bottom, and the soil immediately beneath it, could be a potential source of TPH contamination. To minimize any potential risks of TPH contamination associated with the tank bottom, in August 2002, CH2M HILL removed approximately 6,250 cubic yards of material, including the tank bottom, conducted confirmation soil sampling, backfilled the excavation, and collected additional groundwater data to support final regulatory closure of IR23.

CH2M HILL completed the removal action in accordance with the approved *Final Removal Action Work Plan for IR23 (Tank 772)* (CH2M HILL 2002e). Confirmation soil samples and groundwater samples were collected and analyzed for constituents of concern, including TPH compounds, BTEX, and polynuclear aromatic hydrocarbons. Groundwater samples were also analyzed for MTBE and semivolatile organic compounds. None of the soil or groundwater confirmation samples collected contained these constituents above their

respective laboratory detection limits. Figure 3-2 shows the removal area for IR23 and presents the distribution of the remaining TPH concentrations in soil. The concerns regarding potential impacts to soil and groundwater around Tank 772 (IR23) were remedied, and regulatory closure of IR23 was requested in the *Removal Action Summary Report and Request for Regulatory Closure for IR23* (CH2M HILL 2002a). Regulatory agency approval of the request for closure was received in February 2004 (RWQCB 2004; DTSC 2004).

No further action at IR23 is necessary to ensure protection of human health and the environment.

### 3.2.1.2 IR14 in IA D1

IR14 is the industrial wastewater collection system underground piping and pump stations, designed to collect, pretreat, and convey wastewater from various sources to the industrial wastewater treatment plant (IWTP). The entire Mare Island IWTP collection system comprises 26,000 linear feet of underground pipeline (diameters ranging from 4 to 11 inches), 11 pump stations, and three pretreatment facilities. The pipeline comprises force mains (constructed of cement mortar-lined ductile iron) and gravity-feed pipelines that connect to the buildings (constructed of vitrified clay). The piping is buried at 3 to 6 feet bgs in fill material consisting commonly of gravel and silt-sand-gravel mix with some debris (PRC 1996). Approximately 1,500 feet of this pipeline run through the northern part of IA D1, as displayed in Figure 3-1. The pipeline was connected with Building 201 – the medical clinic – at Industrial Wastewater Pump Station No. 10 (IWPS No. 10), located south of the building.

The IWTP and the majority of the piping (including the 1,500-foot segment in IA D1) and pump stations were constructed in 1972. IWPS No. 10 was likely constructed to collect and convey waste from the medical clinic when Building 201 was built in 1985. The entire system operated until base closure in 1996. The Navy performed removal of sludge and residue and flushing of the entire IWTP collection system in 1996. The environmental concerns associated with the IWTP collection system typically include soil and groundwater contamination that may have resulted from piping system leakage, artificial fill contamination, and/or backfill debris disposal.

The potential presence of soil contamination along the industrial wastewater pipeline and around IWPS No. 10 in IA D1 was investigated in 1993. The soil and groundwater sampling that occurred in 1993 was focused near IWPS No. 10 and approximately every 75 feet along the pipeline within the backfill materials. The backfill materials around the pump stations and pipelines were considered to be the most likely areas where leaks would occur and contamination may exist. The low concentrations and few detected results of TPH compounds, volatile organic compounds, and metals in soils and groundwater indicate that these constituents have not impacted soils and groundwater surrounding the pipeline and pump station in IA D1.

IR14 was identified through the IAS as a Group I IRP site in 1983 (Ecology and Environment 1983). The IAS concluded that none of the 14 sites identified as Group I IRP sites, including IR14, was an immediate threat to human health or the environment. Between 1990 and 1992, IT Corporation conducted Phase I of the remedial investigation at IR14 systemwide to

evaluate whether the IWTP collection system had leaked and whether ABM was in the backfill of the IWTP collection system. There were no data collected in IA D1 during this investigation. A Phase II remedial investigation was conducted between April 1993 and July 1994 and consisted of collecting samples from vacuum excavations performed approximately every 75 feet and collecting samples from direct-push borings around the pump station. The majority of soil samples were submitted for BTEX, TPH compounds, PCBs, and metal analysis. Ten GeoProbe® borings and 18 vacuum excavations were completed during the Phase II activities in IA D1, as presented on Figure 3-3.

The Phase II remedial investigation included the preparation of a baseline human health risk assessment. The *Baseline Human Health Risk Assessment Addendum to the Remedial Investigation Report, Operable Unit 3* presented an evaluation of the potential risks associated with environmental contamination at IR14 in the absence of remedial action (PRC 1997c). Preliminary risk calculations around IWPS No. 10 were not calculated because no constituents of potential concern were identified from a screening of the results versus the ambient levels. Risk calculations on a sample point-by-point basis were performed along the pipeline, and the results indicated that the carcinogenic risk and the hazard index (HI) were within acceptable ranges (PRC 1997c).

The *Investigation Area D1 IR14 Technical Memorandum* (CH2M HILL 2003a) summarized the physical site and contaminant source characteristics; presented an evaluation of the nature and extent of contamination; discussed the fate and transport of constituents and potential exposure pathways; and characterized the potential health or environmental risks from contaminants associated with IR14 in IA D1. Detailed sample results and risk calculations are provided in the technical memorandum. The conclusions of this memorandum included:

- Constituents detected in soil and groundwater at IR14 in IA D1 would not be expected to reach Mare Island Strait for centuries, if at all.
- The estimated cancer risks for the construction worker ( $9 \times 10^{-11}$ ) and for the future resident ( $2 \times 10^{-8}$ ) are below the risk-management range ( $10^{-4}$  to  $10^{-6}$ ) for carcinogens.
- Non-cancer adverse health effects (HI) (0.002 and 0.006) for the construction worker and future resident, respectively, do not exceed the threshold of 1 for non-carcinogens.
- The calculated exposure point concentration for lead (61 mg/kg) is less than the risk-based level that includes the homegrown produce pathway (210 mg/kg).
- The total, ambient, and incremental risks are within or below the risk-management range, and the HIs are less than 1 for the construction worker and potential future residential scenarios.
- There is no complete exposure pathway for terrestrial ecological receptors at IR14 in IA D1.
- Risk posed by IR14 in IA D1 groundwater to aquatic organisms in the Mare Island Strait is considered negligible.

DTSC reviewed the *Investigation Area D1 IR14 Technical Memorandum* and requested an additional sample near former location IR14VB086 to confirm or refute a hot spot for metals

in soils in that location. The additional soil boring (two soil samples) showed low concentrations of metals, as presented in the *Response to DTSC Comments on the Investigation Area D1 IR14 Technical Memorandum* (CH2M HILL 2004e). Therefore, the recommended conclusions in the *Investigation Area D1 IR14 Technical Memorandum* may still be considered in this RAP.

Although the data around IR14 in IA D1 indicate that no evidence of unacceptable risk to human or ecological receptors exists, inspection of the pipeline is required under RCRA to assess if any waste remains in place. Following an inspection of the pipeline using video surveying, an evaluation will be made to determine if additional flushing of the line is required, as presented in Section 4.2.

### 3.2.1.3 Sanitary Sewer in IA D1

The sanitary sewer system at Mare Island was constructed in 1959 to convey wastewater generated at the Naval facility. In 1972, the IWTP and associated pipeline were constructed. This upgrade resulted in the discontinuation of industrial wastewater discharge to the sanitary sewer system, as well as an upgrade of the sanitary sewer system pipelines. Prior to 1959, sanitary and industrial wastewater discharged to the storm sewer system, which discharged into Mare Island Strait.

The sanitary sewer system at Mare Island is currently active. The gravity-flow sanitary sewer system pipelines consist of a main trunk sewer line located along and beneath Railroad Avenue. Smaller branch pipelines flow via gravity to this main trunk. There are approximately 88,000 linear feet of sanitary sewer system pipelines at Mare Island. An 18-inch force main across Mare Island Strait transfers the sanitary wastewater to the City of Vallejo publicly-owned treatment works. Figure 3-1 presents the locations of the sanitary sewer system pipelines and the two domestic pump stations (DOM-10 and DOM-18) in IA D1. DOM-10 is located in the basement of building M37 and was built in 1945. DOM-18 was built in 1977 and is located on the south side of building H79.

Previous investigations of the sanitary sewer system occurred as part of the Group II/III accelerated study to characterize potential soil and groundwater contamination related to the operation of the pump stations. The Navy proposed that a subset of pump stations be sampled in Round 1 as a time- and cost-saving measure. The regulatory agencies requested that enough DOM and STS pump stations be selected as to provide adequate representation of the Mare Island sanitary sewer system. Additionally, the regulatory agencies agreed to this approach with the stipulation that the subset must include a selection criteria involving the state-of-repair of the pump station. The *Group II/III Field Sampling and Analysis Plan* provided this state-of-repair classification, as either "good," "fair," or "poor" (PRC 1997b). This pump station classification provided in the field sampling and analysis plan apparently was obtained from the *Mare Island Final Reuse Plan* (City of Vallejo 1994), but the rationale behind this classification could not be ascertained. DOM-10 and DOM-18 were both classified as pump stations in good condition in IA D1 as part of the Group II/III study. In addition to both DOMs in IA D1 being in good condition, DOM-10 and DOM-18 are both located in non-industrial areas of Mare Island and therefore would have only collected municipal wastewater. DOM-18 was constructed after 1972 and therefore would not have collected industrial wastewater.

In April 2002, CH2M HILL prepared the *Sanitary Sewer Site Identification Technical Memorandum*, which concluded that, based on the previous sampling results and the previous recommendations for NFA, the sanitary sewer pump stations are not an environmental concern, and no further action was required at the sanitary sewer system within the EETP (CH2M HILL 2002b).

With respect to the sanitary sewer system in IA D1, no further action is necessary to ensure protection of human health and the environment.

### 3.2.2 Underground Storage Tanks in IA D1

Twenty-six USTs within IA D1 have been identified and investigated as part of the Navy UST program. Eight additional UST sites have been identified in IA D1 after review of Navy records and historical maps. These USTs are summarized in Table 3-2. All 34 USTs in IA D1 are petroleum-only sites. The locations of the 34 UST sites are shown on Figure 3-1.

The UST/FOPL program includes the identifying and removing USTs and FOPLs and performing abatement activities as necessary. Thirty-four USTs within IA D1 have been identified and investigated as part of the IA D1 UST program. Of these 34 UST sites, CH2M HILL is completing remedial actions (soil removal) at six sites. The remedial actions will be summarized in the *Implementation Report and Request for Closure for Investigation Area D1 Underground Storage Tank Sites and Fuel-oil Pipeline Segments* (CH2M HILL pending), hereafter referred to as the UST and FOPL Implementation Report. Request for closure letters proposing NFA have been submitted for the remaining 28 sites, in accordance with the RWQCB Order.

Details on the previous actions at the UST sites in IA D1 are included in Table 3-2. Six of the UST sites were closed by the Navy (USTs 497, 563-A, 737, 898, 1230, and H-34) as approved by the RWQCB in 1995 (RWQCB 1995a-c). In 2002, CH2M HILL performed site investigation activities at 16 UST sites in IA D1, consistent with the *Sampling and Analysis Plan for IA D1 and IA H2 UST Sites* (hereafter referred to as the UST SAP) (CH2M HILL 2002c). CH2M HILL performed limited investigations in 2002 and 2003 for eight UST sites not identified in the Consent Agreement (USTs M52, H1, 1258, M45, H5, 84-NE, 1268, and 598), consistent with the *Sampling and Analysis Plan for Previously Unidentified USTs, Cisterns, and Oil Houses*, hereinafter referred to as the LI SAP (CH2M HILL 2002f). The *Site Characterization Report for Investigation Area D1 Underground Storage Tank Sites* (hereafter referred to as the UST SCR) summarized investigations performed by CH2M HILL at 17 UST sites in IA D1 and concluded that 11 of the UST sites required NFA (UST Sites 84-Courtyard, 84-North, 201, 521, 563-1, 563-2, 563-3, 563-4, 886, H86, and S43-01) (CH2M HILL 2003c). The UST SCR proposed additional investigation and/or remediation at six UST sites (USTs H5, H74, M37, M51, M130, and OR-16). The additional investigations and/or soil removal actions at five of these UST sites (USTs H74, M37, M51, M130, and OR-16) are summarized in the *Site Characterization Report Addendum: Interim Remedial Action Work Plan, Investigation Area D1 UST Sites* (hereafter referred to as the UST IRA Work Plan), (CH2M HILL 2003d). An additional interim remedial action was performed at UST OR-15 in accordance with the *Interim Remedial Action Work Plan for Underground Storage Tank OR-15* (CH2M HILL 2003e). UST H5 did not require remedial action following additional investigations, as summarized in the site-specific closure request letter submitted to the RWQCB (CH2M HILL 2003i).

**TABLE 3-2**  
Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

Tank Number	Tank Description	Previous Actions	Closure Status
84 Courtyard	Unknown capacity; unknown contents; tank was never located	GPR and EM investigations in 1991 and 2002; sampling consistent with the UST SAP in 2002; evaluation of sample results and request for closure were submitted in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required at UST 84-Courtyard.
84 North	Unknown capacity; unknown contents; tank was never located	GPR and EM investigation in 1991 and 2002; sampling consistent with the UST SAP in 2002; evaluation of sample results and request for closure were submitted in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required at UST 84-North.
201	Former 2,000-gallon tank; contained diesel; tank has been removed	UST 201 and surrounding soils were removed in 1996; sampling consistent with the UST SAP in 2002; evaluation of sample results and request for closure were submitted in the UST SCR.	RWQCB issued a closure approval letter on October 25, 2003. No further action is required for UST 201.
338	Unknown capacity; contained fuel oil; tank was never located	A fuel-oil UST for heating was suspected around Building 338; however, site investigation, GPR, and magnetometer search did not show any evidence of UST 338. CH2M HILL submitted a request for closure letter on June 17, 2002.	RWQCB issued a closure approval letter on May 30, 2003. No further action is required for UST 338.
497	Unknown capacity; unknown contents; tank was never located	A UST was suspected at Building 497 because a vent pipe was observed during visual inspection. A GPR search did not show any evidence of UST 497.  The Navy submitted a request for closure in July 1995.	RWQCB issued a closure approval letter on October 6, 1995. No further action is required for UST 497.
521	Former 110-gallon tank; contained water, gasoline, and fuel oil; tank has been removed	UST 521 and surrounding soils were removed in 1990; site investigations were performed in 1996 and 1997; additional sampling was consistent with the UST SAP performed in 2002; evaluation of sample results and request for closure were submitted in the UST SCR.	RWQCB issued a closure approval letter on October 25, 2003. No further action is required for UST 521.
521 (OR-10)	151,000-gallon tank; contained fuel oil; tank closed in place	In 1997, the top of UST 521 (OR-10) was removed, oily water was pumped out, the inside of the tank was pressure-washed twice, and sampling was performed. The pipeline inlets were sealed, the tank was backfilled, and the area was repaved. The Navy concluded in the Closure-In-Place Summary Report that NFA was appropriate for this site. CH2M HILL submitted a request for closure letter for UST 521 (OR-10) in July 2002.	RWQCB issued a closure approval letter on August 13, 2003. No further action is required for UST 521 (OR-10).

**TABLE 3-2**  
Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

<b>Tank Number</b>	<b>Tank Description</b>	<b>Previous Actions</b>	<b>Closure Status</b>
563-1	Unknown capacity; unknown contents; tank was never located	Visual inspection, GPR, and EM investigations were conducted in 1991; site inspection and sampling were performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required at UST 563-1.
563-2	Unknown capacity; unknown contents; tank was never located	Visual inspection, GPR, and EM investigations were conducted in 1991; site inspection and sampling were performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required at UST 563-2.
563-3	Unknown capacity; unknown contents; tank was never located	Visual inspection, GPR, and EM investigations were conducted in 1991; site inspection and sampling were performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required at UST 563-3.
563-4	Unknown capacity; unknown contents; tank was never located	Visual inspection, GPR, and EM investigations were conducted in 1991; site inspection and sampling were performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued closure approval in a September 26, 2003 letter providing comments on the UST SCR. No further action is required at UST 563-4.
563-A	Unknown capacity; unknown contents; tank was never located	A UST was suspected to exist at north of Building 563 because two steel pipes were observed protruding from the ground. During an EM subsurface investigation, no underground piping or tank was located, and the pipes were concluded to be unused sign posts. The Navy submitted a request for closure in July 1995.	RWQCB issued a closure approval letter on October 6, 1995. No further action is required for UST 563-A.
737	Unknown capacity; unknown contents; tank was never located	A UST was suspected to exist at Building 737 because a wooden vault was located 1.5 feet bgs, thought to have been a fuel fill port. GPR and EM investigations did not show any evidence of UST 737. The Navy submitted a request for closure in July 1995.	RWQCB issued a closure approval letter on October 6, 1995. No further action is required for UST 737.

TABLE 3-2

Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

Tank Number	Tank Description	Previous Actions	Closure Status
772	Former 2,100,000-gallon tank; contained fuel oil; tank has been removed	Former UST 772 is within the boundaries of IR23 (Group I IRP site – Section 3.2.1.1). CH2M HILL requested closure of IR23 (UST 772) under the UST program in October 2002.	RWQCB issued a closure approval letter on February 10, 2004. No further action is required for UST 772.
886	Former 2,000-gallon tank; contained diesel and fuel oil; tank has been removed	UST 886, associated piping, and surrounding soils were removed in 1993; additional soil was removed in 1997; additional investigation was performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued a closure approval letter on October 25, 2003. No further action is required for UST 886.
898	Unknown capacity; unknown contents; tank was never located	A UST was suspected near Building 898 based on discussions with base personnel. A GPR search did not show any evidence of UST 898. The Navy submitted a request for closure in July 1995.	RWQCB issued a closure approval letter on October 6, 1995. No further action is required for UST 898.
1230	Unknown capacity; unknown contents; tank was never located	A UST was suspected at Building 1230 based on observations of a potential vent pipe and fill valves. A GPR and EM search did not show any evidence of UST 1230. The Navy submitted a request for closure in July 1995.	RWQCB issued a closure approval letter on October 6, 1995. No further action is required for UST 497.
H34	Former 575-gallon tank; contained oily water; tank has been removed	UST H34 and surrounding soils were removed in December 1992. No contamination was encountered; excavation was backfilled, compacted, and re-paved. The Navy requested closure of UST H34.	RWQCB issued a closure approval letter on December 4, 1995. No further action is required for UST H34.
H74	Former 7,000-gallon tank; contained fuel oil; tank has been removed	UST H74 and surrounding soils were removed in 1997; SSPTS performed additional investigation in 1998; further investigation was performed consistent with the UST SAP in 2002; evaluation of sample results was included in the UST SCR. UST H74 site was recommended for further remedial action, as summarized in the UST IRA Work Plan.	A request for closure will be submitted to RWQCB following completion of the remedial action, as proposed in the UST IRA Work Plan and summarized in the UST and FOPL Implementation Report.
H86	Former 2,000-gallon cistern; contained water; tank has been removed	UST H86 was removed in 2000; additional investigation was performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB requested additional sampling around UST H86 for TPH-gasoline and MTBE. The additional sampling was conducted in October 2003. A revised request for closure will be submitted to RWQCB in the UST and FOPL Implementation Report.

**TABLE 3-2**  
Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

Tank Number	Tank Description	Previous Actions	Closure Status
M130	Former 560-gallon tank; contained diesel and fuel oil; tank has been removed	UST M130 and surrounding soils were removed in 1997; additional investigation was performed consistent with the UST SAP in 2002; evaluation of sample results was included in the UST SCR. UST M130 site was recommended for further remedial action, as summarized in the UST IRA Work Plan.	A request for closure will be submitted to RWQCB following completion of the remedial action, as proposed in the UST IRA Work Plan and summarized in the UST and FOPL Implementation Report.
M37	Former 1,400-gallon tank; contained fuel oil; tank has been removed	UST M37 and surrounding soils were removed in 1997; additional investigation was performed consistent with the UST SAP in 2002; evaluation of sample results was included in the UST SCR. UST M37 site was recommended for further remedial action, as summarized in the UST IRA Work Plan.	A request for closure will be submitted to RWQCB following completion of the additional investigation as proposed in the UST IRA Work Plan and summarized in the UST and FOPL Implementation Report.
M51	Former 750-gallon tank; contained fuel oil; tank has been removed	UST M51 and surrounding soils were removed in 1997; SSPTS performed additional investigation in 1998; further investigation was performed consistent with the UST SAP in 2002; evaluation of sample results was included in the UST SCR. UST M51 site was recommended for further remedial action, as summarized in the UST IRA Work Plan.	A request for closure will be submitted to RWQCB following completion of the remedial action, as proposed in the UST IRA Work Plan and summarized in the UST and FOPL Implementation Report.
OR-15	151,000-gallon tank; contained fuel oil; tank was demolished in place	OR-15 was cleaned and visibly-contaminated soils were excavated in 1998. The tank was left in place and backfilled. The Navy concluded in the Investigation Summary Report that NFA was appropriate at UST OR-15. The RWQCB denied closure of OR-15 in April 2003. In 2003, CH2M HILL collected additional samples at OR-15 consistent with the RWQCB comments. Subsequently, an interim remedial action was performed in accordance with the <i>Interim Remedial Action Work Plan for Underground Storage tank OR-15</i> .	A request for closure will be submitted to RWQCB following completion of the remedial action, as proposed in the <i>Interim Remedial Action Work Plan for Underground Storage tank OR-15</i> and summarized in the UST and FOPL Implementation Report.
OR-16	151,000-gallon tank; contained fuel oil; tank was demolished in place	Portions of UST OR-16 and surrounding soils were removed in 1998 and the remaining tank portions were pressure washed and left in place and backfilled; TtEMI performed additional investigation in 1999; further investigation was performed consistent with the UST SAP in 2002; evaluation of sample results was included in the	A request for closure will be submitted to RWQCB following completion of the remedial action, as proposed in the UST IRA Work Plan and summarized in the UST and FOPL Implementation Report.

TABLE 3-2

Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

Tank Number	Tank Description	Previous Actions	Closure Status
		UST SCR. UST OR-16 site was recommended for further remedial action, as summarized in the UST IRA Work Plan.	
S43-01	Unknown capacity; contained fuel oil; tank was never located	A magnetometer search and exploratory trench was implemented in 1998; GPR and EM investigations were performed in 2002; additional investigation was performed consistent with the UST SAP in 2002; evaluation of sample results and request for closure were included in the UST SCR.	RWQCB issued closure approval in a September 16, 2003 letter providing comments on the UST SCR. No further action is required for UST S43-01.
M52	Unknown capacity; contained gasoline; tank was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results and request for closure were included in a closure request letter submitted on March 31, 2003.	RWQCB issued a closure approval letter on July 21, 2003. No further action is required for UST M52.
Cistern H1	Unknown capacity; unknown contents; cistern was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results and request for closure were included in the LI SAP in December 2002.	RWQCB issued a closure approval letter on May 15, 2003. No further action is required for Cistern H1.
UST H5 (Cistern 18)	Approximately 85,000-gallon cistern; unknown contents; cistern was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results was included in the UST SCR. CH2M HILL conducted additional sampling in March 2003.	RWQCB issued a closure approval letter on February 10, 2004. No further action is required at UST H5.
Cistern 84-NE	140,000-gallon cistern; contained water and fuel oil; cistern was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. CH2M HILL conducted additional sampling in February 2003. Evaluation of sample results was included in the request for closure letter submitted on September 9, 2003.	RWQCB issued a closure approval letter on January 21, 2004. No further action is required for Cistern 84-NE.
1258	Unknown capacity; unknown contents; tank was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results and request for closure were included in the LI SAP submitted in December 2002.	RWQCB issued a closure approval letter on May 15, 2003. No further action is required for UST 1258.
1268	Former approximately 500-gallon tank; contained gasoline; tank has been	UST 1268 was discovered during deconstruction activities. Tank was removed in August 2003 and confirmation samples were collected, as presented in the Request for	Request for closure being reviewed by RWQCB.

**TABLE 3-2**  
Summary of UST Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Mare Island, Vallejo, California*

<b>Tank Number</b>	<b>Tank Description</b>	<b>Previous Actions</b>	<b>Closure Status</b>
	removed	Closure Letter submitted on February 6, 2004.	
598	Unknown capacity; unknown contents; tank was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results was included in the UST SCR. CH2M HILL conducted additional sampling in March 2003 and submitted a request for closure letter on March 31, 2003.	RWQCB issued a closure approval letter on July 21, 2003. No further action is required for UST 598.
M45	Unknown capacity; contained fuel oil; tank was closed in place	A limited investigation was implemented in June 2002 in accordance with the LI SAP. Evaluation of sample results and request for closure was included in the LI SAP submitted in December 2002.	RWQCB issued a closure approval letter on May 15, 2003. No further action is required for UST M45.

GPR = ground-penetrating radar.

EM = electromagnetic.

The remedial actions conducted at the six UST sites will be summarized in the UST and FOPL Implementation Report (CH2M HILL pending), consistent with the RWQCB Order. CH2M HILL submitted site-specific closure request letters at 11 UST sites (USTs 338, 521 (OR-10), OR-15, M52, H1, 84-NE, 1258, 1268, 598, H5, and M45). UST 772 closure request was included in the *Removal Action Summary Report and Request for Closure for IR23* (CH2M HILL 2002a)

Table 3-2 presents additional details for the history and closure status of each of the UST sites in IA D1. Citations for all UST documents listed in Table 3-2 are included as a separate reference list in Section 6.0. These references are listed by author and submittal date.

### 3.2.3 Fuel Oil Pipeline Segments in IA D1

FOPL segments were identified through a review of available historical plans, drawings, written documentation of previous investigations, and visual surveys. An estimated 51,000 linear feet of FOPL have been installed at MINS over a period of approximately 90 years. Approximately 49,000 feet of FOPL are located within the EETP. The remaining 2,000 feet of FOPL are located outside of the EETP in the vicinity of Mare Island Elementary School and Building 1294. Approximately 15,400 feet of the FOPL are located within IA D1. The locations of the FOPL segments in IA D1 are presented on Figure 3-1. The total length of FOPL segments in IA D1 is presented in Table 3-3.

Field investigations have been performed along the FOPL during 1996 through 2003. The Navy FOPL work was summarized in the *Draft Removal Summary Report for Fuel Oil Pipelines* (Weston 2001) in February 2001. The Navy categorized 92 FOPL segments as either removed, flushed, abandoned in place, or not located (Weston 2001). Approximately 19,000 feet of FOPL were removed, 8,000 feet were flushed, 6,000 feet were abandoned in place, and 10,000 feet were not located during the initial FOPL investigation performed between 1996 and 1999 (Weston 2001). Removed, flushed, abandoned, and non-located segments are presented on Figure 3-1 in red, blue, green, and yellow, respectively.

TABLE 3-3  
Summary of FOPL Segments in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Pipeline Segment	Investigation Area	Pipeline Status					Proposed Interim Remedial Action <sup>a</sup>
		Removed (feet)	Flushed (feet)	Abandoned (feet)	Not Located (feet)	Total (feet)	
D2/2/H74	D1	143	285	0	0	428	Excavate Contaminated Soil
D2/4/B290W	D1, C2	0	0	0	120	120	No Further Action Required
D2/4/B388	D1	160	0	0	0	160	Address Soil Contamination with UST H74
D2/4/B678W	D1	153	45	0	0	198	Excavate Contaminated Soil
D2/4/H74	D1	0	0	120	0	120	Excavate Pipeline and

**TABLE 3-3**  
Summary of FOPL Segments in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Pipeline Segment	Investigation Area	Pipeline Status					Proposed Interim Remedial Action <sup>a</sup>
		Removed (feet)	Flushed (feet)	Abandoned (feet)	Not Located (feet)	Total (feet)	
D2/4/H80	D1	235	514	61	0	810	Contaminated Soil No Further Action Required
D2/2/H1E	D1	0	0	0	340	340	Perform Vacuum Testing
D2/2/H1W	D1	0	0	0	712	712	Perform Vacuum Testing
E2/3/13E	D1	0	0	0	280	280	No Further Action Required
E3/3/13E	D1	25	0	30	510	565	No Further Action Required
E3/6/12ST	D1, C2	115	0	0	0	115	No Further Action Required
E3/2/M130	D1	245	0	0	0	245	No Further Action Required
E3/3/13W	D1	430	114	0	0	544	No Further Action Required
E4/3/13W	D1	90	0	0	0	90	Excavate Contaminated Soil
E4/3/13W1	D1	0	0	0	163	163	No Further Action Required
E3/3/M125	D1	300	40	124	0	464	No Further Action Required
E3/3/M63	D1	393	32	111	0	536	Excavate Contaminated Soil
E3/3/SUISUN	D1, C2	423	475	0	0	898	No Further Action Required
E3/3/B1258	D1	0	0	0	322	322	No Further Action Required
E3/3/M63SW	D1	0	0	0	23	23	No Further Action Required
F1/10/8ST	D1, C2	0	0	0	240	240	No Further Action Required
F2/10/8STE	D1	0	0	0	120	120	No Further Action Required
F1/4/S33A&B	D1	0	0	0	170	170	No Further Action Required
F2/4/S33A&B	D1	0	0	0	642	642	No Further Action Required
F1/8/8ST	D1, C2	130	70	0	0	200	No Further Action Required

**TABLE 3-3**  
Summary of FOPL Segments in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Pipeline Segment	Investigation Area	Pipeline Status					Proposed Interim Remedial Action <sup>a</sup>
		Removed (feet)	Flushed (feet)	Abandoned (feet)	Not Located (feet)	Total (feet)	
F2/8/8ST	D1	808	265	53	0	1,026	No Further Action Required
F2/10/7ST	D1	840	0	0	0	840	Excavate Contaminated Soil
F2/10/8STW	D1	110	0	25	0	135	No Further Action Required
F3/10/8ST	D1	0	0	0	56	56	Excavate Pipeline
F3/6/POPLAR	D1	852	212	0	0	1,064	No Further Action Required
F3/8/8ST	D1	170	0	15	0	185	No Further Action Required
F3/10/ELES	D1	0	0	0	180	180	Excavate Pipeline
G1/10/7ST	D1	0	0	0	207	207	Perform Vacuum Testing
G2/10/7ST	D1	0	0	0	1,061	1,061	Perform Vacuum Testing
G1/VAR/RR4	D1	0	0	0	553	553	No Further Action Required
G1/10/B521	D1	0	0	0	161	161	No Further Action Required
G1/10/RR	D1, C1	0	0	0	120	120	No Further Action Required
G1/4/RR2&RR3	D1, C1	0	0	0	120	120	No Further Action Required
G1/4/RR1	D1	520	250	0	375	1,145	No Further Action Required
<b>TOTAL Segment Lengths in IA D1</b>		<b>6,142</b>	<b>2,302</b>	<b>539</b>	<b>6,475</b>	<b>15,358</b>	

Notes:

<sup>a</sup> The proposed remedial actions stated in this table reflect the conclusions of the *Site Characterization Report/Interim Remedial Action Work Plan Investigation Area D1 Fuel-oil Pipeline Segments* (CH2M HILL 2003f).

The Navy performed further investigation along select segments of the FOPL during 1998 through 2000 (TtEMI and Knudsen 1999 and TtEMI and Washington 2001). Soil and groundwater samples were collected along 27 FOPL segments during these investigations. Additional analytical data were collected along the FOPL during investigations associated with IRP and UST sites during 1993 through 2002. In IA D1, these investigations were performed at IR23, UST H74, UST M51, UST M37, UST M130, and UST OR-16.

As a result of an historic Navy records review performed by CH2M HILL in 2002, 20 additional FOPL segments, seven of which are located in IA D1, were identified that were

not included in the *Draft Removal Summary Report for Fuel-oil Pipelines* (Weston 2001). These additional segments were identified during an extensive review of published reports and unpublished Navy documents, figures, drawings, and maps. The total length of the 20 segments identified during this review is approximately 6,000 feet. The locations of these FOPL segments in IA D1 are presented in orange on Figure 3-1.

CH2M HILL submitted the *Draft Sampling and Analysis Plan for the Fuel-oil Pipeline* (hereafter referred to as the FOPL SAP) in July 2002. Based on regulatory comments to this report, a revised field work approach was developed in collaboration with regulatory agencies. A final FOPL SAP was submitted to agencies in September 2003 that summarized the revised field work approach (CH2M HILL 2003m). The purpose of the FOPL SAP was to provide additional data to characterize the nature and extent of potential contamination along the FOPL segments within the EETP. The FOPL SAP was implemented May through October of 2003. In preparation for implementation of the FOPL SAP, geophysical surveys and pilot tests were performed in October 2002 and January 2003, respectively.

The objectives of the field investigation identified in the final FOPL SAP were achieved during implementation of the SAP. The field investigation included both a limited investigation and additional site characterization activities when necessary. To supplement the existing data set, soil samples were collected at intervals of approximately 50 feet in residential areas; intervals of 100 feet along removed, abandoned, and non-located FOPL segments; and intervals of 200 feet along flushed FOPL segments in both residential and non-residential areas. Soil samples were also collected to confirm the presence of contamination detected during previous investigations. Borings were advanced downgradient of the FOPL for soil and groundwater sample collection when analytical data indicated that a release had occurred from the FOPL or as directed by regulatory agencies. Approximately 370 borings were advanced during the 2002–2003 FOPL investigation, four of which were completed as groundwater monitoring wells. In addition, 32 exploratory trenches were advanced in an attempt to locate previously non-located FOPL segments.

The 39 FOPL segments within IA D1 were investigated consistent with the approach identified in the final FOPL SAP. Each segment was evaluated separately based on the findings of previous investigations, analytical results for soil and groundwater samples, visual inspections during trenching, geophysical surveys, and other site-specific conditions. The conclusions for each FOPL segment within IA D1 are presented in the *Site Characterization Report / Interim Remedial Action Work Plan Investigation Area D1 Fuel-oil Pipeline Segments* (hereafter referred to as the FOPL SCR/IRA Work Plan) (CH2M HILL 2003f). This report also provided conclusions on the remedial action appropriate for each FOPL segment, as presented in Table 3-3.

Twenty-six FOPL segments in IA D1 have been recommended for NFA based on the analytical data collected during previous investigations and during implementation of the SAP. The FOPL SCR/IRA Work Plan concluded that these 26 segments are not a threat to groundwater or surface water and present no significant risk to human health or the environment. In most cases, the FOPL segments have been removed or have passed a vacuum test, resulting in the removal or remediation of the source of potential soil and groundwater contamination. These 26 FOPL segments are therefore low-risk sites and are appropriate for permanent closure. Requests for closure were previously made for five of these 26 FOPL segments in the *Draft Site Closure Summary Report for Fuel Oil Pipeline*

*Segments E3/3/M63SW, F1/8/8ST, F1/10/8ST, F2/8/8ST, and F2/10/8STE in Investigation Area D1*, which was submitted to regulatory agencies in December 2002 (CH2M HILL 2002g). The RWQCB provided concurrence with the recommendation that no further action was appropriate at these five FOPL segments in a letter dated October 28, 2003 (RWQCB 2003). Following RWQCB approval of the FOPL SCR/IRA Work Plan, the remaining 21 FOPL segments for which no further action is appropriate will be closed in accordance with the RWQCB Order.

Thirteen FOPL segments in IA D1 have been recommended for further investigative and/or remedial action. This work is being conducted under the direction of RWQCB in accordance with the RWQCB Order. The proposed investigative and/or remedial action is specific to each FOPL segment based on the findings from the SAP implementation and will consist of vacuum testing, flushing and capping, pipeline excavation, and/or contaminated soil excavation. The proposed remedial actions will be summarized in the UST and FOPL Implementation Report, consistent with the RWQCB Order.

### 3.2.4 PCB Program Sites

Table 3-4 provides a list of the 81 PCB sites within IA D1. This table includes the PCB site name, site description, a summary of previous actions, maximum remaining PCB concentration, sample media, and the site closure status. Citations for all PCB documents included in Table 3-4 are provided as a separate reference list in Section 7.0. These references are listed by author and submittal date. The locations of the IA D1 PCB sites are shown in Figure 3-1.

Between 1994 and 1999, SSPTS performed interim PCB assessments and cleanup actions (where necessary) at the IA D1 PCB sites. Cleanup actions were determined to be necessary at several PCB sites based on this interim assessment data. SSPTS performed cleanup actions at 25 of the PCB sites in IA D1 (Table 3-4). The Hazardous Materials Spill Team performed a cleanup action at one of the PCB sites in IA D1. In addition, cleanup actions are required at 15 of the PCB sites in IA D1; 13 of these 15 sites were already subject to some initial remediation by SSPTS (Table 3-4). Examples of the previous cleanup actions include washing, scabbling (chipping) the surface of concrete, encapsulation, and excavation of asphalt, concrete, and/or soil prior to the TtEMI confirmation sampling. Following the SSPTS assessment and any necessary cleanup actions, TtEMI collected confirmation samples between 1997 and 1999 either to confirm SSPTS findings that no cleanup was necessary or to determine the effectiveness of the SSPTS cleanup actions.

CH2M HILL evaluated the previous site investigations and cleanup actions performed at the 81 PCB sites in IA D1 and prepared the *Final Polychlorinated Biphenyl Work Plan* to outline the procedures for additional investigation and/or remediation activities. The *Final Polychlorinated Biphenyl Work Plan* (CH2M HILL 2003n) illustrates the process for PCB site closure under both CERCLA and the Toxic Substances Control Act (TSCA). PCB sites in the EETP are subject to closure under both TSCA and CERCLA, under the USEPA CA/FO (USEPA et al. 2001), and the Consent Agreement (LMI et al. 2001a), respectively. Closure requirements for PCB-contaminated material pursuant to the TSCA regulations at 40 CFR 761 are regulated by the USEPA. Closure requirements for PCB-contaminated material pursuant to the CERCLA regulations are regulated by DTSC.

PCB sites can be subject to CERCLA if there is a known release to soil or groundwater or there is a potential threat for a release of PCBs to the environment. A potential threat is determined by the following three criteria: 1) potential PCB source present; 2) PCB contamination present; and 3) there is a visible pathway for migration (e.g., a crack in a concrete pad).

For PCB sites where there has been a release to soil, the USEPA Region 9 preliminary remediation goals (PRGs) were used as the soil screening criteria, which are 0.74 mg/kg for industrial use and 0.22 mg/kg for residential use. PCB sites that are either remediated to Region 9 PRGs or subject to site-specific, risk-based closure under CERCLA by default will satisfy any TSCA requirements for site closure. This is because the CERCLA PRGs are more restrictive than TSCA cleanup standards, and a site-specific, risk-based closure process satisfies both USEPA and DTSC.

Out of the 81 PCB sites in IA D1, 52 of the sites did not require a cleanup action based on the results of the SSPTS interim assessment sampling and TtEMI basewide confirmation sampling. CH2M HILL implemented cleanup actions at PCB sites in IA D1 from October 2003 to March 2004, and site-specific summary reports have been submitted in accordance with the Consent Agreement and the USEPA CA/FO. Further remedial action, including land-use covenants, soil and concrete removal, encapsulation, and indoor air evaluation is required at 19 PCB sites in IA D1. No further action is required at the remaining 62 PCB sites as documented in the site-specific closure requests, as referenced in Table 3-4.

Land-use covenants are necessary at 18 PCB sites in IA D1, as presented in Table 3-4. Land-use covenants apply to the following categories of PCB sites in IA D1:

- Indoor sites in industrial land-use areas where the concentration of PCBs in building materials is greater than the high-occupancy TSCA cleanup level of 1 mg/kg but has a maximum PCB concentration of less than 10 mg/kg and an average PCB concentration of less than or equal to 5 mg/kg.
- Outdoor sites in industrial land-use areas where the concentration of PCBs in soil is greater than the USEPA Region 9 residential PRG (0.22 mg/kg) but less than the USEPA Region 9 industrial PRG (0.74 mg/kg).
- Indoor and outdoor sites in residential land-use areas where the concentration of PCBs in concrete is greater than 1 mg/kg and/or the concentration of PCBs in soil is greater than 0.22 mg/kg.
- Sites where elevated PCB concentrations are present in concrete underneath an active transformer, and the transformer serves as encapsulation of the site.
- Indoor sites where PCB concentrations are less than 1 mg/kg but may require an indoor air evaluation and land-use covenant pursuant to Section 67391.1 to Title 22, Division 4.5, Chapter 39 of the California Code of Regulations.

Following agency review and approval of site closure with a land-use covenant, LMI will record the restriction, as appropriate, and provide a copy of the final recorded land-use covenant, along with certification of recordation in Solano County.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 1000	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 1 mg/kg (soil); ND at 5 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1003 AL#01	Transformer pad, east of building, outside	Basewide Confirmation Sampling	ND (soil/concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested a NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building 1010	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 1 mg/kg (soil); ND at 10 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1026	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 10 mg/kg (wood/soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1034	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 5 mg/kg (soil); ND at 10 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 1058 AL#01	Former utility pole, outside	Interim Assessment Sampling, Parcel 06-B1 Basewide Confirmation Sampling	0.04J mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1068 AL#01	Former utility pole, outside	Interim Assessment Sampling, Parcel 06-B1 Basewide Confirmation Sampling	0.08J mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1080 AL#01	Former utility pole, outside	Interim Assessment Sampling, Parcel 06-B1 Basewide Confirmation Sampling	0.1J mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1086 AL#01	Former utility pole, outside	Basewide Confirmation Sampling	ND (Asphalt / Soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1232 AL#01	Floor of former building, inside	Interim Assessment Sampling, Parcel 08-B3 TWD 98-1504, 03/13/98, wash Basewide Confirmation Sampling	0.2 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated May 12, 2003. DTSC issued closure approval on July 7, 2003. USEPA issued closure approval on June 9, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 1234 AL#01	Floor of former building, inside	Interim Assessment Sampling, Parcel 08-B3 TWD 98-1505, 03/13/98, wash TWD 95-0070, 03/02/95, wash TWD 97-1472, 08/16/97, scabble and remove asphalt TWD 97-1472 Rev A, 01/20/98, scabble and remove asphalt TWD 97-1472 Rev B, 06/10/98, remove asphalt floor and soil Basewide Confirmation Sampling	0.1 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated May 12, 2003. DTSC issued closure approval on July 7, 2003. USEPA issued closure approval on June 9, 2003. No further action is required.
Building 1242	Former utility pole, outside	None	--	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1246	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B6	ND at 1 mg/kg (soil); ND at 5 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1252	Former utility pole, outside	None	--	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 1256	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B6 Basewide Confirmation Sampling	ND at 1 mg/kg (soil); ND at 5 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1264	Former utility pole, outside	None	--	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1268	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	0.113J mg/kg (soil); ND at 10 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 1322 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-G TWD 96-1393, 12/12/96, scabble TWD 97-1500-6, 09/15/97, encapsulation around T-1985 Basewide Confirmation Sampling CH2M HILL Site Characterization, Soil Excavation, and Verification Sampling	0.02J mg/kg (concrete); 4,600 mg/kg (under encapsulation in concrete); 0.078 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on August 27, 2003. DTSC issued Cleanup Plan approval on October 23, 2003. USEPA issued Notification approval on September 23, 2003. Requested an NFA determination in a summary report to DTSC/USEPA, dated February 18, 2004. DTSC and USEPA closure approval is pending. Site closure for this active transformer pad will include recordation of an industrial use and encapsulation environmental restriction (land-use covenant).
Building 201 AL#01	Transformer pad, outside	Basewide Confirmation Sampling	0.07J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 201 UL#01	Transformer room, inside	Interim Assessment Sampling, Parcel 03-B	ND (concrete)	<p>issued closure approval on May 28, 2003.</p> <p>No further action is required.</p> <p>Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003.</p> <p>Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.</p> <p>No further action is required.</p>
Building 229 AL#01	Concrete pad, southeast corner, outside	Interim Assessment Sampling, Parcel 03-A 9 Basewide Confirmation Sampling	ND (concrete)	<p>Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003.</p> <p>Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.</p> <p>No further action is required.</p>
Building 229 AL#02	Transformer pad, outside	Interim Assessment Sampling, Parcel 03-A Basewide Confirmation Sampling	0.08 mg/kg (concrete)	<p>Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003.</p> <p>Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.</p> <p>No further action is required.</p>
Building 229 UL#01	West Elevator, inside	Interim Assessment Sampling, Parcel 03-A	4 ppm (unknown media)	<p>Requested an NFA determination in letters to DTSC/USEPA, dated October 15, 2003.</p> <p>DTSC issued closure approval on October 22, 2003. USEPA closure approval is pending</p> <p>Site closure for this building will include recordation of an industrial use environmental restriction (land-use covenant).</p>

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 229 UL#02	East Elevator, inside	Interim Assessment Sampling, Parcel 03-A	ND (unknown media)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building 237 AL#01	Bottom surface of excavation pit, outside	Interim Assessment Sampling, Parcel 03-C  TWD 96-1349, 10/09/96, remove transformer pad  Basewide Confirmation Sampling CH2M HILL Site Characterization Soil Excavation	0.63 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on October 15, 2003.  DTSC issued Cleanup Plan on December 8, 2003. USEPA issued approval of Notification on November 14, 2003.  Requested an NFA determination in a summary report to DTSC/USEPA, dated February 18, 2004. DTSC and USEPA closure approval is pending.  Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 237 AL#02	Concrete floor, near western wall, inside	Interim Assessment Sampling, Parcel 03-C  Basewide Confirmation Sampling CH2M HILL Verification Sampling	1.43J mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated October 15, 2003.  DTSC issued closure approval on October 20, 2003. USEPA closure approval is pending.  Site closure for this building will include recordation of an industrial use environmental restriction (land-use covenant).
Building 237 AL#03	Concrete floor, in northern corner, inside	Interim Assessment Sampling, Parcel 03-C  Basewide Confirmation Sampling	0.59J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 253 AL#01	Floor of building (ground level), inside	Interim Assessment Sampling, Parcel 03-C TWD 95-0020, 01/24/95, wash TWD 96-1382, 12/11/96, remove asphalt TWD 99-1574, 03/26/99, remove soil Basewide Confirmation Sampling	0.2J mg/kg (asphalt); 0.1 mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA, dated September 23, 2003. DTSC issued closure approval on October 7, 2003. USEPA closure approval is pending. Site closure for this building will include recordation of an industrial use environmental restriction (land-use covenant).
Building 253 AL#02	Floor of building (mezzanine level), inside	Interim Assessment Sampling, Parcel 03-C Basewide Confirmation Sampling	5.3 mg/kg (wood)	Requested an NFA determination in letter to DTSC, dated July 8, 2003. DTSC issued closure approval on September 15, 2003. Requested an NFA determination in letter to USEPA, dated September 23, 2003. USEPA closure approval is pending. Site closure for this building will include recordation of an industrial use environmental restriction (land-use covenant).
Building 253 AL#03	Floor of building (second level), inside	Interim Assessment Sampling, Parcel 03-C Basewide Confirmation Sampling	3.83 mg/kg (wood)	Requested an NFA determination in letter to DTSC, dated July 8, 2003. DTSC issued closure approval on September 15, 2003. Requested an NFA determination in letter to USEPA, dated September 23, 2003. USEPA closure approval is pending. Site closure for this building will include recordation of an industrial use environmental restriction (land-use covenant).
Building 257 AL#01	Floor of building, inside	Interim Assessment Sampling, Parcel 03-C Basewide Confirmation Sampling	0.4 mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 41A AL#01	Transformer pad, southern wall, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	0.1J mg/kg (soil)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building 41A AL#02	Compressor shed, eastern corner of building, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	ND (concrete / asphalt)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building 41A UL#01	Former transformer Area, outside	CH2M HILL Limited Investigation	0.0365 mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building 497 AL#01	Transformer room in basement, inside	Interim Assessment Sampling, Parcel 03-A  TWD 97-1467, 07/22/97, drain and remove five transformers Basewide Confirmation Sampling CH2M HILL Site Characterization Sediment removal action	2.09 mg/kg (concrete)	Cleanup Plan/Notification submitted to DTSC/USEPA on November 12, 2003.  DTSC issued Cleanup Plan approval on December 10, 2003. USEPA issued approval of Notification on December 9, 2003  Summary report to DTSC/USEPA requesting an NFA determination is pending.  Site closure will include recordation of an industrial use environmental restriction (land-use covenant).

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 521 AL#01	Transformer room, inside	Interim Assessment Sampling, Parcel 03-A TWD 96-1379, 11/26/1996, scabble TWD 96-1379 Rev A, 05/14/98, scabble TWD 96-1379 Rev B, 08/13/98, scabble Basewide Confirmation Sampling CH2M HILL Site Characterization Concrete and sediment removal	Cleanup Plan in progress	Cleanup Plan/Notification submitted to DTSC/USEPA on November 17, 2003. DTSC issued Cleanup Plan on December 10, 2003. USEPA responded to Notification requesting additional information on December 17, 2003. Provided a response to comments on January 6, 2004. Summary report to DTSC/USEPA requesting an NFA determination is pending. Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 521 AL#02	Transformer pad, outside	Interim Assessment Sampling, Parcel 03-A Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building 521 AL#03	Generator area under building, outside	Interim Assessment Sampling, Parcel 03-A Basewide Confirmation Sampling	ND (soil)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 521 UL#01	Two elevators, inside	Interim Assessment Sampling, Parcel 03-A	1.8 ppm (unknown media)	Requested an NFA determination in letters to DTSC/USEPA, dated October 15, 2003. DTSC issued closure approval on October 22, 2003. USEPA closure approval is pending. Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 563 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 06-B1. TWD 97-1459, 06/13/97, scabble Basewide Confirmation Sampling CH2M HILL Site Characterization Soil excavation	ND (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on November 5, 2003. DTSC issued cleanup plan approval on December 5, 2003. USEPA issued approval of Notification on December 8, 2003 Summary report to DTSC/USEPA requesting an NFA determination is pending.
Building 605 AL#01	First floor, inside	Interim Assessment Sampling, Parcel 03-A TWD 96-1306, 08/23/96, wash TWD 96-1376, 11/20/96, wash TWD 97-1458, 06/12/97, scabble TWD 97-1458 Rev A, scabble Basewide Confirmation Sampling CH2M HILL Site Characterization Vault pump out/inspection; encapsulation of floor	21 mg/kg (concrete);	Cleanup Plan/Notification submitted to DTSC/USEPA on October 24, 2003. DTSC issued Cleanup Plan approval on November 28, 2003. USEPA issued Notification approval on December 4, 2003. Summary report to DTSC/USEPA requesting an NFA determination is pending. Site closure for this former telephone equipment room will include recordation of an industrial use and encapsulation environmental restriction (land-use covenant).

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 605 AL#02	Second floor, inside	Interim Assessment Sampling, Parcel 03-A TWD 96-1307, 08/23/96, wash TWD 96-1389, 12/05/96, scabble Basewide Confirmation Sampling	10 mg/kg (concrete)	Requested an NFA determination in letter to DTSC, dated July 8, 2003. DTSC issued closure approval on September 15, 2003. Requested an NFA determination in letter to USEPA, dated October 2, 2003. USEPA requested additional information in a letter dated November 28, 2003. A response to comments letter was sent to USEPA on December 16, 2003. A response to USEPA is pending. Site closure of this building will include recordation of an industrial use environmental restriction (land-use covenant).
Building 671 AL#01	Electrical Substation A, inside	Interim Assessment Sampling, Parcel 06-B1 TWD 97-1460, 06/16/97, scabble Basewide Confirmation Sampling <i>Building deconstruction</i>	8.4 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA dated November 7, 2003. DTSC issued closure approval on December 22, 2003. USEPA issued closure approval on December 17, 2003. Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 737 AL#01	Compressor in western small room, inside	Interim Assessment Sampling, Parcel 06-A TWD 95-0297, 06/09/95, wash TWD 95-0548, 08/09/95, drain oil, rinse with kerosene, refill with <2ppm PCBs oil Basewide Confirmation Sampling	0.008J mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated September 16, 2003. DTSC issued closure approval on September 30, 2003. USEPA issued closure approval on October 2, 2003. No further action is required.
Building 760 AL#01	Transformer pad, eastern wall, outside	Interim Assessment Sampling, Parcel 06-A Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 774 AL#01	Former utility pole, outside	Interim Assessment Sampling, Parcel 09-B Basewide Confirmation Sampling	0.03J mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 781 AL#01	Electrical Substation C, Inside of an uncovered structure	Interim Assessment Sampling, Parcel 06-B1 TWD 97-1466, 07/17/97, scabble and remove asphalt Basewide Confirmation Sampling <i>Building deconstruction</i>	2.4 mg/kg (concrete); 0.4J mg/kg (soil)	Requested an NFA determination in letters to DTSC/USEPA dated November 17, 2003. DTSC issued closure approval on December 22, 2003. USEPA requested additional information in a letter dated December 17, 2003. A response to comments letter is pending. Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 84 AL#01	Floor of building, inside	Interim Assessment Sampling, Parcel 08-B7 TWD 95-0070, 03/02/95, wash TWD 97-1472, 08/16/97, scabble and remove asphalt TWD 97-1472, Rev A, 01/20/98, scabble and remove asphalt TWD 97-1472, Rev B, 06/10/98, remove asphalt and soil Basewide Confirmation Sampling Additional non-stain specific sampling Removal of four stained areas of the floor	0.72 mg/kg (asphalt)	Requested an NFA determination for soil and asphalt removal in letter to DTSC dated October 22, 2003. DTSC issued closure approval on soil and asphalt removal November 6, 2003. Notification submitted to USEPA on October 22, 2003. USEPA requested additional sampling in a letter dated November 14, 2003. Issued a response to comments letter dated December 24, 2003. USEPA approved the Notification on February 18, 2004. Requested an NFA determination in a summary report to USEPA dated February 27, 2004. USEPA closure approval is pending. Indoor air evaluation is being conducted as requested by DTSC. Additional remedial action may be required pending the indoor air results.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 898 AL#01	Floor of substation, inside/outside	Interim Assessment Sampling, Parcel 08-B7 TWD 97-1418, 03/17/97, scabble TWD 97-1418 Rev A, 07/08/97, scabble TWD 97-1418 Rev B, 08/05/97, scabble TWD 97-1418 Rev C, 09/18/97, scabble TWD 98-1500-9, 01/13/99, encapsulation under T-1807 TWD 98-1500-9 Rev A, 03/15/99, encapsulation around T-1807 & trench floor and walls TWD 97-1418 Rev D, 03/15/99, scabble Basewide Confirmation Sampling CH2M HILL Site Characterization Soil excavation and sediment removal	0.15 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on November 12, 2003. DTSC issued Cleanup Plan approval on December 10, 2003. USEPA requested additional information in a letter dated December 9, 2003. Issued a response to comments letter on December 23, 2003. USEPA issued approval of Notification on February 12, 2004 Summary report to DTSC/USEPA requesting an NFA determination is pending.
Building 926 AL#01	Transformer vault, underground, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA responded on May 28, 2003 with request for additional information. Provided a response to comments in letter to USEPA, dated September 3, 2003. USEPA issued closure approval on March 1, 2004. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 944 AL#01	Electrical equipment room, inside	Interim Assessment Sampling, Parcel 09-B Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building 944 AL#02	Generator room, inside	Interim Assessment Sampling, Parcel 09-B Basewide Confirmation Sampling	1.7 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated October 2, 2003.  DTSC issued closure approval on October 8, 2003. USEPA issued closure approval on November 28, 2003.  Site closure will include recordation of an industrial use environmental restriction (land-use covenant).
Building 944 AL#03	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-B TWD 97-1430, 03/06/97, scabble TWD 97-1430 Rev A, 04/05/97, scabble TWD 97-1430 Rev B, 06/08/98, scabble TWD 97-1463, 07/01/97, soil removal TWD 97-1463 Rev A, 12/22/97, soil removal TWD 97-1463 Rev B, 01/28/98, soil removal Basewide Confirmation Sampling (TtEMI 1998) Concrete Pad Removal and Soil Excavation	ND (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on October 31, 2003.  DTSC issued Cleanup Plan approval on November 28, 2003. USEPA issued Notification approval on December 4, 2003.  Requested an NFA determination in a Summary Report to DTSC/USEPA, dated February 18, 2004. DTSC and USEPA closure approval is pending.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building 944 UL#01	Transformer and drip pan fell from forklift	HAZMAT Spill Team Cleanup Action CH2M HILL Limited Investigation Soil Excavation	0.33 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on July 24, 2003. DTSC issued Cleanup Plan on September 4, 2003. USEPA issued Notification approval on September 15, 2003.  Requested an NFA determination in a summary report to DTSC/USEPA, dated January 14, 2004. DTSC issued closure approval on January 28, 2004. USEPA closure approval is pending.
Building 974	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 5 mg/kg (soil); ND at 10 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building 992	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B1	ND at 5 mg/kg (soil); ND at 10 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on September 23, 2003. No further action is required.
Building H1 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C  TWD 98-1511, 05/26/98, scabble Basewide Confirmation Sampling	0.3 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated September 16, 2003. DTSC issued closure approval on September 30, 2003. USEPA issued closure approval on October 2, 2003. No further action is required.
Building H34 AL#01	Floor of building, inside	Interim Assessment Sampling, Parcel 09-C  Basewide Confirmation Sampling	0.3J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building H70 AL#01	Rocker arm east of building, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building H70 AL#02	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	0.5 mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building H71 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	ND (soil/concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building H73 AL#01	Elevator	Basewide Confirmation Sampling	1 mg/kg (tile)	Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. Requested an NFA determination in letter to DTSC, dated June 20, 2003. DTSC issued closure approval on September 11, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building H73 AL#02	Elevator shaft	Interim Assessment Sampling, Parcel 09-C TWD 95-0507, 07/28/95, wash elevator railings and shaft wall TWD 97-1447, date unknown, scabble floor and wash walls/equipment Basewide Confirmation Sampling	ND (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated June 20, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on August 28, 2003. No further action is required.
Building H73 AL#03	Elevator machinery room	Interim Assessment Sampling, Parcel 09-C TWD 95-0023, 01/30/95, wash TWD 95-0178, 05/10/95, wash TWD 95-0326, 06/14/95, wash elevator/motor foundation TWD 95-0507, 07/28/95, wash elevator railings and shaft wall TWD 97-1447, 06/11/97, scabble, install new drip pans Basewide Confirmation Sampling	0.01J mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated June 20, 2003. DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on August 28, 2003. No further action is required.
Building H73 AL#04	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	ND (soil/concrete)	Requested an NFA determination in letter to DTSC regarding 101 sites where PCBs were not detected, dated May 2, 2003. DTSC issued closure approval on August 6, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building H73 AL#05	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C Basewide Confirmation Sampling	0.05J mg/kg (soil)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.
Building H73 AL#06	Transformer room	Interim Assessment Sampling, Parcel 09-C TWD 98-1520, 07/28/98, scabble Basewide Confirmation Sampling	3.5 mg/kg (concrete)	Requested an NFA determination in letters to DTSC/USEPA, dated October 13, 2003.  DTSC issued closure approval on October 8, 2003. USEPA closure approval is pending.  No further action is required. Site closure for this former transformer room will include recordation of an industrial use environmental restriction (land-use covenant).
Building H73 UL#01	Elevator room in attic	Interim Assessment Sampling, Parcel 09-C TWD 97-1447, 06/11/97, wash equipment	ND	Requested an NFA determination in letters to DTSC/USEPA, dated June 20, 2003.  DTSC issued closure approval on September 11, 2003. USEPA issued closure approval on August 28, 2003.  No further action is required.
Building H74 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-G Basewide Confirmation Sampling	0.005J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building H83 AL#01	Transformer room floor, inside/outside	Interim Assessment Sampling, Parcel 09-C TWD 97-1489, 09/23/97, scabble TWD 97-1489 Rev A, 04/10/98, scabble Basewide Confirmation Sampling CH2M HILL Site Characterization Soil excavation and concrete cutting	Cleanup action is in progress	Cleanup Plan/Notification submitted to DTSC/USEPA on August 20, 2003. DTSC issued Cleanup Plan approval on September 15, 2003. USEPA issued Notification approval on September 18, 2003. Summary report to DTSC/USEPA requesting an NFA determination is pending.
Building H86 AL#01	Transformer pad, east of building, outside	Interim Assessment Sampling, Parcel 09-F Basewide Confirmation Sampling	0.02 mg/kg (soil)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building H86 AL#02	Transformer pad, east of building, outside	Interim Assessment Sampling, Parcel 09-F Basewide Confirmation Sampling	0.04 mg/kg (soil)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building H86 AL#03	Electrical vault, east of building, outside	Interim Assessment Sampling, Parcel 09-F Basewide Confirmation Sampling	0.08 mg/kg (soil)	Requested an NFA determination in letter to DTSC regarding 10 outdoor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on September 10, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building H89 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 09-C TWD 97-1446, 05/01/97, scabble TWD 97-1446 Rev A, 03/13/98, scabble large concrete pad & excavate small concrete pad TWD 98-1514, 07/27/98, remove soil TWD 97-1500-8, 07/29/98, never completed encapsulation TWD 99-1565 05/05/99, remove soil, remove 2 transformers & demolish pad TWD 99-1565 Rev A, 06/10/99, build new pad and reinstall transformers TWD 99-1565 Rev B, 07/13/99, re-arrange transformer pad grounding system Basewide Confirmation Sampling CH2M HILL Site Characterization Soil Excavation	0.76 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on October 17, 2003. DTSC issued Cleanup Plan approval on November 13, 2003. USEPA issued Notification approval on December 4, 2003. Requested an NFA determination in a summary report to DTSC/USEPA, dated March 15, 2004. DTSC and USEPA closure approval is pending.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building M31 AL#01	Former utility pole, outside	Interim Assessment Sampling, Parcel 08-B5. Basewide Confirmation Sampling	ND at 0.34 mg/kg (soil); ND at 0.013 mg/kg (wood)	Requested an NFA determination in letters to DTSC/USEPA regarding the former utility pole sites in IA D1, dated May 5, 2003. USEPA issued closure approval on September 23, 2003. DTSC provided comment requesting additional sampling in a September 11, 2003 letter. CH2M HILL provided a response to this comment on October 16, 2003 requesting a NFA determination without additional sampling.
Building M37 AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 08-A TWD 97-1481, 09/12/97, scabble TWD 97-1481 Rev A, 06/10/98, scabble TWD 97-1481 Rev B, 07/30/98, scabble TWD 98-1562, 12/01/98, soil removal TWD 98-1562 Rev A, 06/09/99, remove brick and concrete; remove asphalt; soil excavation Basewide Confirmation Sampling CH2M HILL Site Characterization Soil Excavation	0.36 mg/kg (soil)	Cleanup Plan/Notification submitted to DTSC/USEPA on October 30, 2003. DTSC issued Cleanup Plan approval on November 28, 2003. USEPA requested additional sampling in letter dated December 8, 2003. Issued a response to USEPA comments in a letter dated December 9, 2003. USEPA approval is pending. Requested an NFA determination in a summary report to DTSC/USEPA, dated March 15, 2004. DTSC and USEPA closure approval is pending.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building Q17A AL#01	Transformer pad, outside	Interim Assessment Sampling, Parcel 06-B1 Basewide Confirmation Sampling CH2M HILL Site Characterization Soil Excavation	2.6 mg/kg (concrete); 0.15 mg/kg (soil)	Cleanup Plan submitted to DTSC on October 29, 2003. DTSC issued Cleanup Plan approval on December 8, 2003. Requested an NFA determination in a summary report to DTSC dated March 15, 2004. DTSC closure approval is pending. Requested an NFA determination in letter to USEPA, dated October 29, 2003. USEPA approval is pending.
Building S33-14 AL#01	Floor of bomb shelter, inside	Interim Assessment Sampling, Parcel 05-H Basewide Confirmation Sampling	0.2 mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.
Building S33-16 AL#01	Floor of bomb shelter, inside	Interim Assessment Sampling, Parcel 05-H Basewide Confirmation Sampling	0.02J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003. Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003. No further action is required.

**TABLE 3-4**  
Summary of PCB Sites in Investigation Area D1  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site Name	Site Description	Previous Actions	Maximum Remaining PCB Concentration (media)	Closure Status
Building S33-19 AL#01	Floor of bomb shelter, inside	Interim Assessment Sampling, Parcel 05-H Basewide Confirmation Sampling	0.07J mg/kg (concrete)	Requested an NFA determination in letter to DTSC regarding six indoor floor sites in IA D1, dated May 14, 2003. DTSC issued closure approval on August 25, 2003.  Requested an NFA determination in letter to USEPA regarding 272 sites not subject to additional TSCA evaluation, dated May 2, 2003. USEPA issued closure approval on May 28, 2003.  No further action is required.

Notes: SSPTS conducted Interim Assessment Sampling; TtEMI conducted Basewide Confirmation Sampling.

J = Estimated concentration.

ND = Not detected.

AL = Assessment Location.

UL = Unknown Location.

ppm = parts per million.

### 3.2.5 Other Potential Environmental Concerns

Other investigations or surveys related to environmental concerns in IA D1 were conducted and are summarized in the *Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b). Many of the potential environmental concerns were identified during other investigations and were addressed during the base closure process, during which the Navy removed, cleaned, and closed its operations, structures, and equipment to render the parcels and buildings in IA D1 suitable to lease. The *Investigation Area D1 Site Identification Technical Memorandum* summarized all previous investigations and actions and concludes that these other potential sources of contamination in IA D1 did not need to be carried forward as sites of environmental concern (CH2M HILL 2003b). ABM, LBP in soil, and pesticides in soil are being discussed in this RAP because additional investigation and/or remediation has occurred since preparation of the *Final Investigation Area D1 Site Identification Technical Memorandum*. A summary of these recent investigations/remedial actions is presented below.

#### 3.2.5.1 Abrasive Blast Material

Historically, extensive abrasive blasting has been performed throughout the former MINS to prepare ship hulls for repainting. Because LBP was used on ships, elevated levels of lead are sometimes found in the spent ABM. Other contaminants found in spent ABM include chromium, copper, nickel, zinc, tributyltin, and organotin compounds (TtEMI 1999b). Periodically, ABM was used for pipeline bedding material and as backfill following excavations. Based on past UST and utility repair and closure work at Mare Island, ABM typically has been encountered in between 5 and 10 percent of the excavations. Specific to IA D1, ABM was found as backfill during the UST M37 excavation, in Navy utility excavations at IR23 (TtEMI 1999b), and during deconstruction activities at the former Farragut and Coral Seas Villages.

A *Final Technical Memorandum for Human Health Risk and Ecological Assessment on Greensand* was prepared that evaluated the risks associated with ABM present in backfill material used around utility lines and other locations on Mare Island (TtEMI 1999b). Based on the findings of this report, DTSC determined that the remaining sandblast grit in utility trenches (not including IRP sites and UST sites) at Mare Island does not present a need for further action (DTSC 1999). However, as DTSC's conclusion was subject to ongoing and developing information, reporting procedures for future encounters of sandblast grit were established.

ABM was discovered beneath the concrete housing foundation slabs in Coral Sea Village and in utility trenches in the former Farragut and Coral Sea Villages during deconstruction activities in IA D1. Samples of the ABM were collected and analyzed for metals prior to removal and off-site disposal of the ABM. The analytical results for the soil sample collected of ABM found in a utility trench from Coral Sea Village showed concentrations of chromium (2,320 mg/kg), nickel (1,390 mg/kg), and lead (77 mg/kg). Analytical results for a sample of ABM collected from a utility trench from the former Farragut Village reported chromium at a concentration of 700 mg/kg, nickel at a concentration of 590 mg/kg, and lead at a concentration of 110 mg/kg.

Excavation and off-site disposal of ABM from beneath the concrete foundations of the former residential buildings and backfill around subsurface utilities in the former Farragut

and Coral Sea Villages occurred between March and August 2003. Specifically, excavation and off-site disposal of ABM at the former Coral Sea Village included removal of ABM from beneath 17 former residential buildings and approximately 3,117 linear feet of utility trenches. ABM backfill was removed from approximately 1,580 linear feet of subsurface utilities in the former Farragut Village housing area. ABM was also removed from beneath one building in the former Farragut Village. The final volume of ABM excavated and disposed off site from both the former Farragut and Coral Sea Villages was approximately 2,754 cubic yards. Figures 3-4 and 3-5 present the locations where ABM removal occurred.

Consistent with the flowchart presented in the *Sampling and Analysis Plan for Abrasive Blast Material* (CH2M HILL 2003g), excavation of ABM in soil at the former Coral Sea Village was performed using visual confirmation techniques, as ABM is identified by its characteristic emerald-green color. Excavation activities were performed until all visual ABM was removed. Following completion of the excavation activities, verification soil samples were collected to demonstrate the removal of ABM based on visual confirmation techniques. Verification samples were collected in May and June 2003 from beneath the former foundation slabs at the 17 buildings where ABM was encountered in the former Coral Sea Village. Verification soil samples were collected either as discrete samples for localized ABM (e.g., only encountered underneath one end of a former building foundation), or as a soil composite sample if the ABM was distributed across the majority of the footprint of the former building foundation. Each composite verification sample consisted of only two parent soil samples.

Verification soil samples were analyzed for metals and tin and compared to the 2002 USEPA Region 9 residential PRGs and ambient concentrations for metals in fill materials (TtEMI 1999a). The analytical results are presented in the *Final Technical Memorandum for the Removal of Abrasive Blast Material in Soil at Former Coral Sea Village and Former Farragut Village, Investigation Area D1 Deconstruction Area* (CH2M HILL 2004a). The concentrations of all metals in the verification soil samples were below both the USEPA Region 9 residential PRGs and the ambient levels, as presented in Table 3-5.

TABLE 3-5  
Verification Sample Results, Excavation of ABM at the Former Coral Sea Village  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Analyte	Maximum Concentration (mg/kg)	USEPA PRG for Residential Land Use (mg/kg) <sup>a</sup>	Ambient Concentration for Fill Material (95 <sup>th</sup> Percentile) (mg/kg)
Aluminum	10,200	76,000	35,000
Antimony	ND<2.9	31	8.5
Arsenic	12.6	22 <sup>b</sup>	36
Barium	170	5,400	NE
Beryllium	0.5	150	0.90 <sup>c</sup>
Cadmium	2.1	37	5.2
Chromium	106	210	140

TABLE 3-5

Verification Sample Results, Excavation of ABM at the Former Coral Sea Village  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Analyte	Maximum Concentration (mg/kg)	USEPA PRG for Residential Land Use (mg/kg) <sup>a</sup>	Ambient Concentration for Fill Material (95 <sup>th</sup> Percentile) (mg/kg)
Cobalt	9.1	900	NE
Copper	24	3,100	120
Iron	22,000	23,000	62,000
Lead	24	150	59
Manganese	479	1,800	1,600
Mercury	0.18	6.1	2.0
Molybdenum	ND<0.97	390	NE
Nickel	71.9	1,600	130
Selenium	0.3	390	NE
Silver	ND<0.57	390	NE
Thallium	ND<0.24	5.2	DL <sup>d</sup>
Tin	ND<5.7	18	NE
Vanadium	38.9	550	190
Zinc	66	23,000	230

Notes:

<sup>a</sup> 2002 USEPA Region 9 residential PRG.

<sup>b</sup> Non-cancer endpoint.

<sup>c</sup> Ambient limit was set at the maximum detected value in the ambient data set because a parametric estimate of the 95th percentile would have exceeded that value.

<sup>d</sup> At the request of the regulatory agencies, the ambient limit was set at the detection limit.

DL = detection limit.

NE = an ambient concentration has not been established for this constituent.

Based on the analytical results for soil verification samples collected within the former Coral Sea Village (i.e., concentrations of metals in verification samples did not exceed evaluation criteria) and the demonstrated success of ABM removal based on visual confirmation techniques, verification soil samples were not collected following the excavation of ABM from subsurface utilities at the former Farragut Village.

Results for verification soil samples collected from the former Coral Sea Village following excavation and off-site disposal of all visually-observed ABM showed metals concentrations below their relevant screening levels, indicating removal of ABM by excavation and visual confirmation techniques was successful. Based on these results, CH2M HILL requested no further action in relation to ABM at the former Coral Sea Village and the former Farragut Village areas in Investigation Area D1, as presented in the *Final Technical Memorandum for*

*the Removal of Abrasive Blast Material in Soil at Former Coral Sea Village and Former Farragut Village, Investigation Area D1 Deconstruction Area (CH2M HILL 2004a).*

ABM was encountered in a small stockpile and in the shallow subsurface surrounding sprinkler heads and utility vaults in Chapel Park. Excavation of ABM from Chapel Park occurred in February 2004 and was performed using visual confirmation techniques, as ABM is identified by its characteristic emerald-green color. Excavation activities were performed until all visual ABM was removed. The final volume of ABM excavated and disposed off site from Chapel Park was approximately 2 cubic yards. Removal of ABM by excavation and visual confirmation techniques was successful. Based on these results, no further action in relation to ABM at Chapel Park in IA D1 is required.

ABM removal activities have been completed in the former Farragut and Coral Sea Villages and Chapel Park, and no further action is required in these areas. ABM may exist in other areas of IA D1, and if, during future development activities, ABM is encountered, it will continue to be handled under DTSC oversight. A procedure for managing ABM will be developed as part of RAP implementation.

### 3.2.5.2 Lead in Soil from Lead-based Paint

LBP was commonly used on structures at MINS until 1978. Navy surveys have verified the presence of LBP on many building surfaces and the presence of lead in soil adjacent to structures painted with LBP. Lead found in soil adjacent to structures painted with LBP is considered a hazardous substance and should be investigated and remediated as a CERCLA release. DTSC has stated that all buildings must be evaluated for lead in soil at Mare Island.

Previous investigations for lead in soil and LBP have occurred in IA D1 but were limited to specific residential and demolished buildings, consistent with the proposed approach to evaluate LBP in IA D1, as presented in the *Final Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b). Surveys performed in residential areas of IA D1 (Farragut Village, the "Q" quarters along Azuar Drive, "Captain's Row," and other residential areas along Mesa Road and Cedar, Sargo, Wahoo, and Wawsmuth Avenues) during 1995 and 1996 concluded that LBP was present throughout the buildings inspected. Samples were collected from foundation areas, roadsides, driveways, walkways, and fence lines at the residential structures within IA D1 (MINS 1996j-m, 1997). The results from these lead surveys, as well as the conclusions that no sites of environmental concern were identified based on the historical data, were presented in the *Final Investigation Area D1 Site Identification Technical Memorandum* (CH2M HILL 2003b).

Remedial action has been performed in specific areas within IA D1, either because these areas were to be occupied or deconstructed. Two buildings in Touro University (Buildings 926 and 928) were characterized and remediated in 2003 to allow occupancy of Touro University students. At the direction of DTSC, in 2002 and 2003, additional lead sampling was performed in the soil around structures in the former Farragut and Coral Sea Villages. Based on these results of those sampling events, excavation of lead-impacted soils was completed in the former Farragut and Coral Sea Villages. These previous remedial actions and the evaluation of LBP at the remaining buildings in IA D1 are presented in the sections below.

**Lead in Soil from LBP in the Former Farragut and Coral Sea Villages.** Although the results of the 1996 Navy LBP soil sampling at structures in the former Farragut and Coral Sea Villages indicated that lead was not present in soil at concentrations exceeding regulatory limits, Harding ESE recommended that several remedial actions be performed in the former Farragut Village along Poplar and Madrone Avenues and 9<sup>th</sup> Street. Exterior painted surfaces were power-washed and repainted; loose paint chips were collected and disposed; and a 6-inch-thick layer of wood chips was placed around the perimeter of each building in June and July 1999 (Harding ESE 2001). In August 2002, at the direction of DTSC, CH2M HILL performed sampling for LBP at 19 duplex buildings in the former Farragut Village. The evaluation for LBP in soil was implemented in accordance with the DTSC-approved *Sampling and Analysis Plan for Evaluation of Lead-based Paint in Soil at Farragut Village/Touro College Housing Area* (CH2M HILL 2002h). CH2M HILL presented the soil sampling procedures and analytical results in the *Evaluation of Lead in Soil at Farragut Village/Touro University Housing Area*, which was submitted to the regulatory agencies on September 16, 2002 (CH2M HILL 2002i). Figure 3-6 presents the locations of the buildings that were sampled. Analytical results from the sampling event were evaluated using the risk-based criterion for an unrestricted land-use scenario derived from the DTSC Lead Spread 7 Model. Mare Island-specific values for lead in water and air were used in the model. The resulting risk-based threshold criterion for lead based on unrestricted land use is 210 mg/kg. Concentrations of lead exceeding the risk-based lead threshold criterion of 210 mg/kg were present at eight former residential buildings in the former Farragut Village: Building 956, Building 958, Building 1062, Building 1068, Building 1078, Building 1080, Building 1082, and Building 1084.

In March 2003, CH2M HILL performed sampling for lead in soil around 10 buildings within the former Coral Sea Village in accordance with the *Final Generic Sampling and Analysis Work Plan for Evaluation of Lead-based Paint and Pesticides in Soil* (CH2M HILL 2003h) and *Sampling and Analysis Plan for Evaluation of Lead-based Paint in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area* (CH2M HILL 2003o). The buildings that were sampled were selected based on the age, size, historical use, and type of the structures within the proposed investigation area and included former residential buildings and non-residential buildings. Composite samples were collected along the drip lines of the buildings (approximately 10 to 12 inches away from the edge of the building), and discrete surface soil samples were collected in the mid-yard areas. Figure 3-7 shows the buildings within the former Coral Sea Village that were sampled during this investigation. Thirty-eight composite samples were collected along the drip lines of the 10 buildings, and 38 discrete surface soil samples were collected in the mid-yard areas within the former Coral Sea Village. The samples were submitted to a laboratory for lead analysis using USEPA Method 6020. Concentrations of lead exceeding the risk-based lead threshold criterion of 210 mg/kg for unrestricted land use were present at Building 41, Building 1230 (including adjacent Buildings 338 and 1232), and Building 978. Building 978 is the only residential structure of those structures sampled where lead concentrations exceeded 210 mg/kg. The maximum detected lead at Building 978 was 285 mg/kg. Based on these results, DTSC determined that remediation was not warranted at Building 978 and that additional sampling was not required around additional structures. The soil sample results are presented in the *Evaluation of Lead-based Paint in Soil at the Former Coral Sea Village and the*

*Former Farragut Village/Touro University Housing Area, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California (CH2M HILL 2004b).*

Based on a May 14, 2003 meeting between CH2M HILL and DTSC, further action (i.e., soil removal) at the buildings impacted by LBP was required at buildings where either the average lead concentrations of the composite drip-line soil samples for that building exceeded the risk-based threshold criterion of 210 mg/kg, and/or the average lead concentrations of the mid-yard samples for that building exceeded 210 mg/kg. Soil removal was also required if the lead concentration in a single soil sample (composite or mid-yard) significantly exceeded the risk-based criterion of 210 mg/kg, even if the average of samples did not exceed the risk-based criterion. Based on this methodology, only four of 19 buildings within the former Farragut Village required removal actions: Building 956, Building 1062, Building 1078, and Building 1080. Only two of 10 buildings within the former Coral Sea Village required removal actions: Building 41 and Building 1230. Figures 3-6 and 3-7 show the buildings where soil removal actions occurred within the former Farragut Village and the former Coral Sea Village, respectively. Soil excavation for LBP in soil around the former locations of the buildings in the former Farragut and Coral Sea Villages was performed in October 2003 through January 2004. Analytical results for lead in verification soil samples that were collected following the excavation and off-site disposal activities are presented in the *Evaluation of Lead-based Paint in Soil at the Former Coral Sea Village and the Former Farragut Village/Touro University Housing Area, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004b). Table 3-6 presents a summary of the structures where soil removal occurred and the maximum concentrations of lead in soil remaining around the buildings.

TABLE 3-6

Summary of Soil Removal Areas for LBP in Soil in the Former Farragut and Coral Sea Villages  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building Number	Summary of Soil Excavation	Total Number of Verification Samples Collected	Maximum Remaining Concentration at the Former Building Location
41 (Former Coral Sea Village)	Removed soil from southwest corner of Building 41 around a mid-yard sample and from the northwest portion of Building 41 along drip-line samples.	25	270 mg/kg  the average of lead concentrations at the drip-line (78.5 mg/kg) does not exceed the risk-based threshold
1230/338 (Former Coral Sea Village)	Removed soil east of Building 338 around mid-yard and drip-line.	11	82.4 mg/kg
956 (Former Farragut Village)	Removed soil from the northern portion of the building around the drip-line samples.	9	105 mg/kg
1062 (Former Farragut Village)	Removed soil from southeast end of building around the drip-line sample.	6	139 mg/kg

**TABLE 3-6**

Summary of Soil Removal Areas for LBP in Soil in the Former Farragut and Coral Sea Villages  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building Number	Summary of Soil Excavation	Total Number of Verification Samples Collected	Maximum Remaining Concentration at the Former Building Location
1078 (Former Farragut Village)	Removed soil from southeast end of building around the drip-line sample.	8	67.4 mg/kg
1080 (Former Farragut Village)	Removed soil from northeast portion of the building around the drip-line sample.	12	147 mg/kg

As presented in the *Evaluation of Lead-based Paint in Soil at the Former Coral Sea Village and the Former Farragut Village/Touro University Housing Area, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004b), approximately 160 cubic yards of lead-impacted soil were excavated from the former Farragut and Coral Sea Villages.

With respect to LBP in soil in the former Farragut and Coral Sea Villages, no further action is necessary to ensure protection of human health and the environment.

**Lead in Soil from LBP at Buildings 926 and 928 in Touro University Area.** In October 2002, at the direction of DTSC, MACTEC Engineering and Consulting, Inc. (MACTEC) conducted surface soil sampling at the Bachelor Officers' Quarters (Building 926) and the associated garages (Building 928) to determine the nature and extent of potential lead contamination from LBP. The sampling was performed in preparation for the residential use of the Bachelor Officers' Quarters. The evaluation for LBP in soil was implemented in accordance with the DTSC-approved *Sampling and Analysis Plan for Evaluation of Lead-based Paint in Soil at Building 926 Bachelor Officers Quarters and Building 928 Garages* (Harding ESE 2002). Soil sampling was performed in the drip-line and mid-yard areas of Building 926 and the drip line along the west end of Building 928. The results indicated that nine of the soil samples exceeded 210 mg/kg for lead. In January 2003, under the direction of DTSC, an additional 24 composite soil samples were collected to determine the lateral extent of soil lead contamination.

Based on the results of the 2002 and 2003 sampling events, 2 inches of lead-impacted soil were removed from the areas with concentrations of lead in soil above 210 mg/kg. After soil removal work was complete, 16 composite confirmation soil samples were collected. Results of the confirmation soil samples indicated four areas with concentrations of lead above 210 mg/kg. The average lead concentrations along the drip lines and corresponding mid-yard samples were below 210 mg/kg.

A summary of the remedial action and the analytical results of the confirmation samples is provided in the *Results of Additional Soil Lead Sampling For Remediation of Lead Contaminated Soils Bachelors Officers Quarters, Building 926 & Garages, Building 928 Touro University, Mare*

*Island Campus*, which was submitted to the regulatory agencies on April 4, 2003 (MACTEC 2003). MACTEC concluded that there is no remaining risk-based soil lead hazard present to prevent the planned use of the buildings. In addition, a "Land Use Covenant Waiver Request" was submitted to DTSC in compliance with the mutually-approved mitigation plan for soil hazards for Building 926 (including the garage area). On May 14, 2003, DTSC concluded that no further action is necessary to allow unrestricted use of Buildings 926 and 928 and approved the waiver request for unrestricted use of Buildings 926 and 928 (DTSC 2003).

With respect to LBP in soil around Buildings 926 and 928, no further action is necessary to ensure protection of human health and the environment.

**Lead in Soil from LBP Outside of the Former Farragut and Coral Sea Villages.** Approximately 200 structures in IA D1 have not been demolished. DTSC has requested that all structures older than 1978 with painted surfaces and unpaved surrounding areas be characterized and remediated for lead in soil from LBP, as necessary. Applying the above criteria to existing structures in IA D1 results in 155 structures requiring characterization. Table 3-7 presents the 155 structures that require characterization and, depending on the results of the characterization, may be subject to remediation.

TABLE 3-7

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building No./ Structure/ Facility	Building Name/Use	Current Status	Proposed Future Land Use
1 <sup>a</sup>	Commandants Quarters (Quarters I and T combined)	Vacant	Residential
6	First Lieutenants Quarters	Vacant	Residential
17 <sup>b</sup>	Officers Quarters	Occupied – Administrative	Residential
56	Alden Park Bandstand	Vacant	Park
84	Marine Prison	Vacant	Residential
104 <sup>b</sup>	St. Peter's Chapel	Occupied – Administrative	Park
133	Quarters-Officers, with Garage	Vacant	Residential
160	Quarters-Public, with Garage	Vacant	Residential
229	Data Processing Building	Vacant	Mixed Use
237	Storage	Vacant	Mixed use
253	Storage	Vacant	Mixed use
255	Flammable/Fluid Storage - attached to B47/47A	Vacant	Mixed Use
257	Storage	Vacant	Mixed use

**TABLE 3-7**

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Building No./ Structure/ Facility</b>	<b>Building Name/Use</b>	<b>Current Status</b>	<b>Proposed Future Land Use</b>
376 <sup>a</sup>	Duplex Motel Transient Housing	Vacant	Residential
396 <sup>a b</sup>	Farragut Inn (Ex Officers Club)	Occupied – Education	Educational
411	Quarters-Enlisted/Officers	Vacant	Residential
417	Warehouse-Administrative Supplies	Vacant	Mixed use
420	Quarters-Enlisted/Officers	Vacant	Residential
429	Quarters-Enlisted/Officers	Vacant	Residential
431	Quarters-Enlisted/Officers	Vacant	Residential
435	Garage/Storage	Vacant	Residential
497	Shipyards Security Office	Vacant	Mixed use
511	Garage (Two separate 10 car buildings)	Vacant	Residential
563 <sup>a</sup>	Quarters-Enlisted	Vacant	Residential
605 <sup>b</sup>	Telephone Exchange	Occupied – Administrative	Mixed use
671	Electrical Substation A	Vacant	Residential
733 <sup>b</sup>	Religious Education	Occupied – Administrative	Educational
737 <sup>b</sup>	Chapel/Community Center	Occupied – Administrative	Educational
764	Officers Quarters	Vacant	Residential
781	Transformer Station C	Vacant	Residential
886	Heating Plant Building	Vacant	Educational
888 <sup>b</sup>	Bath House	Occupied – Education	Educational
892 <sup>a b</sup>	Unknown	Occupied – Education	Educational
894	Swimming Pool Filter House	Vacant	Educational
901	Quarters or shed	Vacant	Historic Core
944	Talos Training Building	Vacant	Mixed use
950	Standby Generator	Vacant	Mixed use
1278	Storage Building	Vacant	Educational
1322 <sup>b</sup>	Dining Facility	Occupied – Education	Educational
133B	Garage	Vacant	Residential
160a	Garage	Vacant	Residential

**TABLE 3-7**

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Building No./ Structure/ Facility</b>	<b>Building Name/Use</b>	<b>Current Status</b>	<b>Proposed Future Land Use</b>
17b	Residential Garage	Vacant	Residential
17c	Residential Garage	Vacant	Residential
19a	Residential Garage	Vacant	Residential
237a	Storage	Vacant	Mixed use
376a	Quarters-Enlisted	Vacant	Residential
429A	Unknown	Vacant	Residential
47A	Administrative Offices	Vacant	Mixed Use
605A	AT&T Combined Area Telephone System	Vacant	Mixed Use
6D	Garage	Vacant	Residential
A <sup>a b</sup>	Officers Quarters	Occupied - Administrative	Historic Core
A1	Residential Garage	Vacant	Historic Core
AA	Shed	Vacant	Historic Core
AA15	Platform/Stage	Vacant	Park
AJ	Shed	Vacant	Historic Core
B <sup>a b</sup>	Officers Quarters	Occupied - Administrative	Historic Core
BG	Residential Garage	Vacant	Historic Core
C <sup>a</sup>	Officers Quarters	Vacant	Historic Core
CA	Servant's Quarters	Vacant	Historic Core
CJ	Residential Garage	Vacant	Residential
D <sup>a</sup>	Officers Quarters	Vacant	Historic Core
DG	Residential Garage	Vacant	Residential
E <sup>a b</sup>	Officers Quarters	Occupied – Administrative	Historic Core
EC	Residential Garage	Vacant	Residential
ED	Storage Shed	Vacant	Historic Core
EF	Officers Quarters	Vacant	Residential
F <sup>a</sup>	Officers Quarters	Vacant	Residential
G <sup>a b</sup>	Officers Quarters	Occupied – Administrative	Historic Core
GB	Residential Garage	Vacant	Residential

**TABLE 3-7**

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Building No./ Structure/ Facility</b>	<b>Building Name/Use</b>	<b>Current Status</b>	<b>Proposed Future Land Use</b>
H <sup>a</sup>	Officers Quarters	Vacant	Historic Core
H1 <sup>a</sup>	Headquarters Building	Vacant	Educational
H34	Storage	Vacant	Educational
H4	Medical Officers Quarters	Vacant	Mixed Use
H5	Medical Officers Quarters	Vacant	Mixed Use
H64	Garage to Quarters H4 and H5	Vacant	Residential
H70	Guided Missile Laboratory	Vacant	Educational
H71 <sup>a</sup>	Truett Hall-Bachelor Enlisted Quarters	Vacant	Educational
H72 <sup>a</sup>	Training Building	Vacant	Educational
H73	Office and Bachelor Enlisted Barracks	Vacant	Educational
H74	Missile Training Facility	Vacant	Educational
H79	Bachelor Enlisted Quarters	Vacant	Educational
H80 <sup>a</sup>	Tactical Data Systems Laboratory	Vacant	Educational
H81	Tactical Data Systems Laboratory	Vacant	Educational
H83 <sup>a b</sup>	Navelex Administration	Occupied – Education	Educational
H84 <sup>a b</sup>	Navelex Administration	Occupied – Education	Educational
H86 <sup>b</sup>	Main Touro University building	Occupied – Education	Educational
H89	Navy Exchange Annex	Vacant	Educational
HB	Residential Garage	Vacant	Historic Core
HC	Storage Shed	Vacant	Residential
HD	Shed	Vacant	Residential
J <sup>a</sup>	Officers Quarters	Vacant	Historic Core
JE	Garage	Vacant	Residential
K <sup>a b</sup>	Officers Quarters	Occupied – Commercial	Historic Core
KE	Garage	Vacant	Residential
KL	Residential Garage	Vacant	Historic Core
L <sup>a</sup>	Officers Quarters	Vacant	Historic Core

**TABLE 3-7**

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Building No./ Structure/ Facility</b>	<b>Building Name/Use</b>	<b>Current Status</b>	<b>Proposed Future Land Use</b>
LF	Garage	Vacant	Residential
M <sup>a</sup>	Officers Quarters	Vacant	Historic Core
M1	Officers Quarters	Vacant	Mixed Use
M125	Detached Garage Storage	Vacant	Residential
M126	Detached Garage Storage	Vacant	Residential
M170	Store for MCFR	Vacant	Park
M1A	Servants Quarters	Vacant	Mixed use
M1C	Garage	Vacant	Mixed Use
M2	Public Quarters	Vacant	Residential
M2A	Garage	Vacant	Residential
M3	Public Quarters	Vacant	Residential
M31	Unknown	Vacant	Residential
M37	Marine Headquarters and Enlisted Men's Barracks	Vacant	Residential
M3A	Garage	Vacant	Residential
M4	Public Quarters	Vacant	Residential
M4A	Garage	Vacant	Residential
M5	Public Quarters	Vacant	Residential
M5A	Garage	Vacant	Residential
M60	Shop and Public Work Maintenance Building	Vacant	Residential
M63	Commissary Storehouse	Vacant	Residential
M7	Quarters	Vacant	Mixed Use
M7A	Garage	Vacant	Mixed Use
MO	Garage	Vacant	Residential
N <sup>a</sup>	Officers Quarters	Vacant	Historic Core
NH	Garage/Servant's Quarters	Vacant	Residential
O <sup>a b</sup>	Officers Quarters	Occupied – Administrative	Historic Core
OB	Servant's Quarters at Quarters O	Vacant	Residential

**TABLE 3-7**

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

<b>Building No./ Structure/ Facility</b>	<b>Building Name/Use</b>	<b>Current Status</b>	<b>Proposed Future Land Use</b>
OF	Garage	Vacant	Residential
P <sup>a b</sup>	Officers Quarters	Occupied – Administrative	Residential
PD <sup>b</sup>	Residential Garage	Occupied – Administrative	Residential
Q1-2 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q1A-2A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q3-4 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q3A-4A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q5-6 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q5A-6A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q7-8 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q7A-8A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q9-10 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q9A-10A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q11-12 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q11A-12A	Garage/Servants Quarters	Occupied – Residential	Residential
Q13-14 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q13A-14A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q15-16 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q15A-16A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q17-18 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q17A-18A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
Q19-20 <sup>a b</sup>	Officers Quarters	Occupied – Residential	Residential
Q19A-20A <sup>a b</sup>	Garage/Servants Quarters	Occupied – Residential	Residential
R <sup>a b</sup>	Officers Quarters	Occupied – Administrative	Residential
RG	Garage	Vacant	Residential
S <sup>a</sup>	Officers Quarters	Vacant	Residential
S43-01 <sup>b</sup>	Bomb Shelter	Occupied – Education	Educational
SB	Garage	Vacant	Residential

TABLE 3-7

Summary of Remaining Buildings for Characterization and/or Remediation for LBP in Soil in the Former Farragut and Coral Sea Villages

*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building No./ Structure/ Facility	Building Name/Use	Current Status	Proposed Future Land Use
Shed NH	Shed near NH garage	Vacant	Residential
U <sup>a</sup>	Officers Quarters	Vacant	Residential
UB	Garage	Vacant	Residential
UD	Garage	Vacant	Residential

<sup>a</sup> Buildings that have been sampled during previous investigations.

<sup>b</sup> Buildings that are currently occupied.

Previous investigations for lead in soil have occurred at the occupied buildings being used as temporary adult residential housing. The maximum concentrations of lead in soil range from 56 to 1,022 mg/kg around these structures. These concentrations are appropriate for the current land use. Further remediation for lead in soil around these structures is required to achieve the lead cleanup goals as specified in Section 4.2.2 in order to allow future unrestricted use.

### 3.2.5.3 Pesticides

Historically, pesticides and herbicides may have been used around residential and non-residential areas of IA D1. Chlordane application around the foundations of new buildings was standard practice until approximately 1987, when the Navy discontinued its use (Radian 1992).

In June 2003, CH2M HILL performed sampling for pesticides in soil at 25 buildings within the former Coral Sea Village, in accordance with *Final Generic Sampling and Analysis Work Plan for Evaluation of Lead-based Paint and Pesticides in Soil* (CH2M HILL 2003h) and *Sampling and Analysis Plan for Evaluation of Pesticides in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area* (CH2M HILL 2003i). The buildings that were sampled were selected based on the age, size, historical use, and type of structures and included former residential and non-residential buildings within the proposed investigation area. In general, two discrete soil samples were collected beneath the former concrete slabs of the buildings (one sample from each half of the building footprint). As non-residential Building 338 and Building 1232 were relatively small compared to the other buildings sampled, only one sample was collected beneath the former slab of these two buildings. Three samples were collected beneath non-residential Building 41, as this building was larger than the other buildings sampled. Forty-nine soil samples were submitted for laboratory analysis of pesticides using USEPA Method 8081. Figure 3-8 shows the locations of the buildings where soil samples were collected during this investigation.

Five pesticide compounds were detected above laboratory reporting limits, including:

- Gamma-chlordane (detected in 33 of 49 samples).

- Heptachlor (detected in four of 49 samples).
- 4,4'-DDD (detected in one of 49 samples).
- 4,4'-DDE (detected in two of 49 samples).
- 4,4'-DDT (detected in five of 49 samples).

Pesticide concentrations in the soil samples were compared to their respective USEPA Region 9 PRGs for residential land use. Only concentrations of gamma-chlordane and heptachlor exceeded USEPA residential PRGs of 1.6 mg/kg and 0.11 mg/kg, respectively. Concentrations of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT did not exceed their respective USEPA residential PRGs. Pesticide concentrations that exceeded the USEPA residential PRGs were collected from Building 338, Building 1236, Building 1248, and Building 1254. The highest concentration of gamma-chlordane was detected in soil sampled from historical Building 338, built in 1918. This building was used as an office, is located adjacent to the Building 1230 near the radar tower, and is not located within the former residential housing area. Marginal exceedances of USEPA residential PRGs for gamma-chlordane and heptachlor were encountered in soil samples collected from three former residential buildings (Buildings 1236, 1248, and 1254) located in the northwestern lobe of the former Coral Sea Village.

To address the areas in the former Coral Sea Village where concentrations of pesticides in soil exceeded USEPA Region 9 residential PRGs, soils were excavated at four buildings (Building 338, Building 1236, Building 1248, and Building 1254). The soil excavation occurred at the half of the footprint of the building where the discrete soil sample results were above the USEPA Region 9 residential PRGs. The exceptions were:

- At Building 338, the soil from the entire building footprint was removed due to the relatively small size of the building.
- At Building 1248, soil was removed from the entire footprint of the building, as concentrations of both chlordane and heptachlor concentrations marginally exceeded USEPA residential PRGs in both soil samples collected under the building.

Figure 3-8 presents the areas where the soil excavation occurred. Soil removal actions for pesticides were performed from October 2003 to February 2004. Analytical results for pesticides in verification soil samples that were collected following the excavation and off-site disposal of soil in the former Coral Sea Village are presented in the *Evaluation of Pesticides in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004c). Table 3-8 presents a summary of the soil excavation activities and the maximum concentrations of pesticides in soil remaining around the buildings.

**TABLE 3-8**  
Summary of Soil Removal Areas for Pesticides in Soil  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building Number	Total Number of Verification Samples Collected	Maximum Remaining Concentration (mg/kg)		
		Constituent	Max. Concentration (mg/kg)	USEPA Residential PRG (mg/kg)

**TABLE 3-8**  
Summary of Soil Removal Areas for Pesticides in Soil  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building Number	Total Number of Verification Samples Collected	Maximum Remaining Concentration (mg/kg)		
		Constituent	Max. Concentration (mg/kg)	USEPA Residential PRG (mg/kg)
338 / 1230	46	4,4'-DDT	0.0091	1.7
		Alpha-chlordane	0.46	NE
		Dieldrin	0.023	0.03
		Gamma-chlordane	0.28	NE
		Heptachlor	0.042	0.11
		Heptachlor epoxide	0.035	0.053
1236	19	4,4'-DDE	0.0022J	1.7
		4,4'-DDT	0.0072	1.7
		Alpha-chlordane	0.072	NE
		Chlordane	0.89	1.6
		Endrin	0.0081 J	18
		Endosulfan sulfate	0.0041 J	NE
		Gamma-chlordane	0.06	NE
		Heptachlor	0.0032 J	0.11
		Heptachlor epoxide	0.0044 J	0.053
		Methoxychlor	0.0026	310
1248	43	4,4'-DDD	0.021 J	2.4
		4,4'-DDE	0.0058 J	1.7
		4,4'-DDT	0.012	1.7
		Aldrin	0.014	0.029
		Alpha-BHC	0.0013 J	NE
		Alpha-chlordane	0.26 J	NE
		Chlordane	0.83	1.6
		Endosulfan sulfate	0.0042 J	NE
		Endrin	0.0081 J	18
		Gamma-chlordane	0.330	NE
		Heptachlor	0.034	0.11
		Heptachlor epoxide	0.0023 J	0.053
		Methoxychlor	0.0017 J	310

**TABLE 3-8**  
Summary of Soil Removal Areas for Pesticides in Soil  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building Number	Total Number of Verification Samples Collected	Maximum Remaining Concentration (mg/kg)		
		Constituent	Max. Concentration (mg/kg)	USEPA Residential PRG (mg/kg)
1254	46	4,4'-DDD	0.077	2.4
		4,4'-DDE	0.012	1.7
		4,4'-DDT	0.031	1.7
		Aldrin	0.0018 J	0.029
		Alpha-chlordane	0.140	NE
		Chlordane	0.460	1.6
		Gamma-chlordane	1.0	NE
		Heptachlor	0.0067	0.11
		Heptachlor epoxide	0.0067	0.053

Notes:

J = estimated concentration.

NE = an ambient concentration has not been established for this constituent.

Analytical results from soil verification samples show that remaining pesticides concentrations in soil at the former Coral Sea Village do not exceed USEPA Region 9 residential PRGs. As presented in the *Evaluation of Pesticides in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004c), approximately 2,350 cubic yards of pesticides-impacted soil were excavated from the former Coral Sea Village.

No further action is necessary with respect to pesticides in soil in the former Coral Sea Village to ensure protection of human health and the environment.

### 3.2.5.4 Black Granular Material Near Building H74

In August 2002, as part of the investigation of former UST H74, a 1-foot-thick layer of black granular material was intercepted at approximately 4 feet bgs. The layer was encountered during installation of monitoring well USTH74MW0101, approximately 20 feet east of the southeast corner of Building H74. A sample of the black granular material was collected from 4 feet bgs at boring USTH74MW0101, and the results showed elevated concentrations of TPH-diesel, TPH-motor-oil, and PAHs. In August 2003, at the direction of DTSC, additional investigation of the black granular material was performed. The investigation was performed consistent with the *Sampling and Analysis Plan for Additional Characterization of Black Granular Material at Building H74, Investigation Area D1* (CH2M HILL 2003p).

Seven borings were installed around monitoring well USTH74MW0101, as presented in Figure 3-9. Soil samples were collected at three depth intervals at five of the borings (15 soil samples) and analyzed for TPH, PAHs, PCBs, and metals. Analytical results are presented

in the *Investigation Area D1 Black Granular Material at Building H74 Technical Memorandum* (CH2M HILL 2003j).

Small amounts of black granular material mixed with silty sand (less than 25 percent black granular material) were observed in two of the seven of the borings (USTH74GB0109 and USTH74GB0112). Two soil samples were collected where the black granular material was observed (USTH74GB0109 at 2 and 4 feet bgs). The results show that concentrations of PCBs and PAHs were all below the laboratory reporting limits. Metals were detected in the soil sample but at concentrations below the USEPA Region 9 PRGs for residential use and/or the ambient levels for fill at Mare Island. TPH-motor-oil was detected above the RWQCB Tier I environmental screening levels (ESLs) (500 mg/kg) in the sample collected at 4 feet bgs at a concentration of 740 mg/kg. TPH-motor-oil was not detected above laboratory reporting limits at the same boring in the 2-foot or 7-foot soil sample.

Soil samples were also collected in soils where black granular material was not observed during installation of the borings. The results of these soil samples showed detections of PAHs, TPH, Aroclor-1260, and metals above laboratory reporting limits. The only constituents found at concentrations above the USEPA Region 9 residential PRGs were Aroclor-1260 (one sample) and iron (10 samples). All concentrations of iron were below the ambient screening levels for fill at Mare Island (TtEMI 1999b). Aroclor-1260 was detected in one soil sample collected from USTH74GB0111 at 4 feet bgs at 0.25 mg/kg, which is marginally above the USEPA Region 9 residential PRG of 0.22 mg/kg. PCBs were not detected above laboratory reporting limits in any of the other four soil samples analyzed for PCBs. The concentrations of Aroclor-1260 and iron do not present a significant impact to soils.

One groundwater sample was collected in August 2003 from monitoring well USTH74MW0101 and analyzed for TPH, PAHs, PCBs, and metals. Metals were the only constituents detected above laboratory reporting limits. A comparison to both the Tier I ESLs and the ambient concentrations for Mare Island was performed, and only aluminum, manganese, and nickel exceed the screening criteria. The concentrations of aluminum (580 µg/L) and manganese (5,900 µg/L) exceed their respective ambient background concentrations only marginally (480 µg/L and 5,400 µg/L, respectively). The maximum nickel concentration of 44 J µg/L falls within the range of ambient metal concentrations for nickel (7.5 to 82 µg/L). Nickel was not detected at elevated concentrations (i.e., above screening levels) in soil during the black granular material investigation.

Black granular material was only observed in two borings (USTH74GB0109 and USTH74GB0112) in small amounts and was not observed in any of the other five soil borings. Step-out borings from USTH74GB0109 and USTH74GB0112 located approximately 5 feet away from these parent borings did not contain any black granular material. Soil samples collected from the areas where the black granular material were observed do not show exceedances of screening criteria with the exception of TPH-motor-oil, which is bounded by lower concentrations in soil samples both vertically and laterally. The limited extent of the black granular material and the results of the soil and groundwater evaluation suggest that there is no significant impact to soil or groundwater associated with the black granular material in the vicinity of monitoring well USTH74MW0101, and no further action is required. This conclusion is documented in the *Technical Memorandum for the Black Granular Material Near Building H74, Investigation Area D1* (CH2M HILL 2003j) and the

*Update to the Technical Memorandum for the Black Granular Material Near Building H74, Investigation Area (CH2M HILL 2004d).* The update memorandum was prepared to present a screening-level risk evaluation to support the NFA finding for unrestricted land use around the black granular material near Building H74. No further action is necessary to ensure protection of human health and the environment with respect to the black granular material near Building H74.

### 3.3 Summary of Sites

The sections above present site descriptions and evaluation of the previous investigations that have occurred at all the environmental sites in IA D1. This section summarizes all the sites in IA D1 and identifies whether further action is required. The UST and FOPL sites, and the PCB sites where there has not been a release to soil or water, are not included in this summary section. Remedial decisions about those sites are being made in accordance with the RWQCB Order (for UST and FOPL sites) and the USEPA CA/FO (for PCB sites).

As presented in the sections above, an NFA determination for unrestricted use is appropriate at the following sites:

- IR23
- Sanitary Sewer in IA D1
- ABM within the Former Farragut and Coral Sea Villages
- LBP in Soil within the Former Farragut and Coral Sea Villages
- LBP in Soil around Buildings 926 and 928
- Pesticides in Soil within the Former Coral Sea Villages
- Black Granular Material near Building H74
- PCB Sites:
  - Building 1000
  - Building 1003 AL#01
  - Building 1010
  - Building 1026
  - Building 1034
  - Building 1058 AL#01
  - Building 1068 AL#01
  - Building 1080 AL#01
  - Building 1086 AL#01
  - Building 1232 AL#01
  - Building 1234 AL#01
  - Building 1242
  - Building 1246
  - Building 1252
  - Building 1256

- Building 1264
- Building 1268
- Building 201 AL#01
- Building 201 UL#01
- Building 229 AL#01
- Building 229 AL#02
- Building 229 UL#02
- Building 237 AL#03
- Building 257 AL#01
- Building 41A AL#01
- Building 41A AL#02
- Building 41A UL#01
- Building 521 AL#02
- Building 521 AL#03
- Building 563 AL#01
- Building 737 AL#01
- Building 760 AL#01
- Building 774 AL#01
- Building 898 AL#01
- Building 926 AL#01
- Building 944 AL#01
- Building 944 AL#03
- Building 944 UL#01
- Building 974
- Building 992
- Building H1 AL#01
- Building H34 AL#01
- Building H70 AL#01
- Building H70 AL#02
- Building H71 AL#01
- Building H72 AL#01
- Building H73 AL#01
- Building H73 AL#02
- Building H73 AL#03
- Building H73 AL#04
- Building H73 AL#05
- Building H73 UL#01
- Building H74 AL#01
- Building H86 AL#01
- Building H86 AL#02
- Building H86 AL#03
- Building H89 AL#01
- Building M31 AL#01
- Building M37 AL#01
- Building Q17A AL#01

- Building S33-14 AL#01
- Building S33-16 AL#01
- Building S33-19 AL#01

A remedy is proposed at the remaining environmental sites in IA D1 as presented in Table 3-9. The descriptions of the proposed remedies are presented in Section 4.0.

TABLE 3-9

Summary of CERCLA Sites Investigation Area D1 that Require Further Action  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Environmental Site	Constituents of Concern and Maximum Remaining Concentration (mg/kg)	Future Land Use	Cleanup Goal
IR14 in IA D1	NA – concern is potential waste remaining inside the pipeline	Residential, mixed-use	Pipeline has no waste remaining in place and no major breaks in the line.
Lead in soil from LBP within IA D1 (outside of the Former Farragut and Coral Sea Villages)	Lead (NA)	Residential, Park, Educational/Civic, Historic Core, and Mixed-use	Residential: average 210 mg/kg with maximum of 400 mg/kg Non-residential: average 750 mg/kg with maximum of 1,000 mg/kg
PCB Sites:			
Building 1322 AL#01	PCBs: 0.02J mg/kg (concrete); 4,600 mg/kg (concrete under encapsulation); 0.078 mg/kg (soil)	Educational/Civic	1 mg/kg in exposed concrete. 0.22 mg/kg in soil Encapsulation of the concrete beneath the transformer and recordation of a land-use covenant.
Building 229 UL#01	PCBs: 4 ppm (media unknown)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 237 AL#01	PCBs: 0.63 mg/kg (soil)	Mixed use	Land-use covenant: maximum of 0.74 mg/kg
Building 237 AL#02	PCBs: 1.43J mg/kg (concrete)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 253 AL#01	PCBs: 0.2J mg/kg (asphalt); 0.1 mg/kg (soil)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 253 AL#02	PCBs: 5.3 mg/kg (wood)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.

TABLE 3-9

Summary of CERCLA Sites Investigation Area D1 that Require Further Action  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Environmental Site	Constituents of Concern and Maximum Remaining Concentration (mg/kg)	Future Land Use	Cleanup Goal
Building 253 AL#03	PCBs: 3.83 mg/kg (wood)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 497 AL#01	PCBs: 2.09 mg/kg (concrete)	Mixed use	Land-use covenant: industrial use with restricted access based on risk assessment calculations
Building 521 AL#01	PCBs: Cleanup plan in progress for concrete	Historical Core	Land-use covenant: low occupancy area – maximum of 25 mg/kg in concrete
Building 521 UL#01	PCBs: 1.8 ppm (media unknown)	Historical Core	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 605 AL#01	PCBs: 21 mg/kg (concrete)	Mixed use	Encapsulation of the concrete floor and recordation of a land-use covenant: maximum of 25 mg/kg and average of less than 10 mg/kg and two coats of contrasting color paint
Building 605 AL#02	PCBs: 10 mg/kg (concrete)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 671 AL#01	PCBs: 8.4 mg/kg (concrete)	Residential	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building 781 AL#01	PCBs: 2.4 mg/kg (concrete); 0.4J mg/kg (soil)	Residential	Land-use covenant: industrial use with restricted access based on risk assessment calculations
Building 84 AL#01	PCBs: 0.72 mg/kg (asphalt)	Residential	Indoor air risk evaluation as compared to background concentrations and the PRG for PCBs in ambient air ( $3.4 \times 10^{-3} \mu\text{g}/\text{m}^3$ ).
Building 944 AL#02	PCBs: 1.7 mg/kg (concrete)	Mixed use	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
Building H72 AL#01	PCBs: 0.5mg/kg (concrete); 20mg/kg (concrete under encapsulation); 0.21 mg/kg (soil)	Educational/Civic	1 mg/kg in exposed concrete 0.22 mg/kg in soil Encapsulation of the concrete beneath the transformer and recordation of a land-use

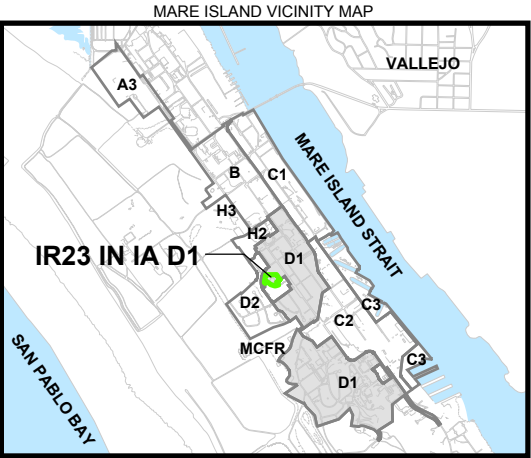
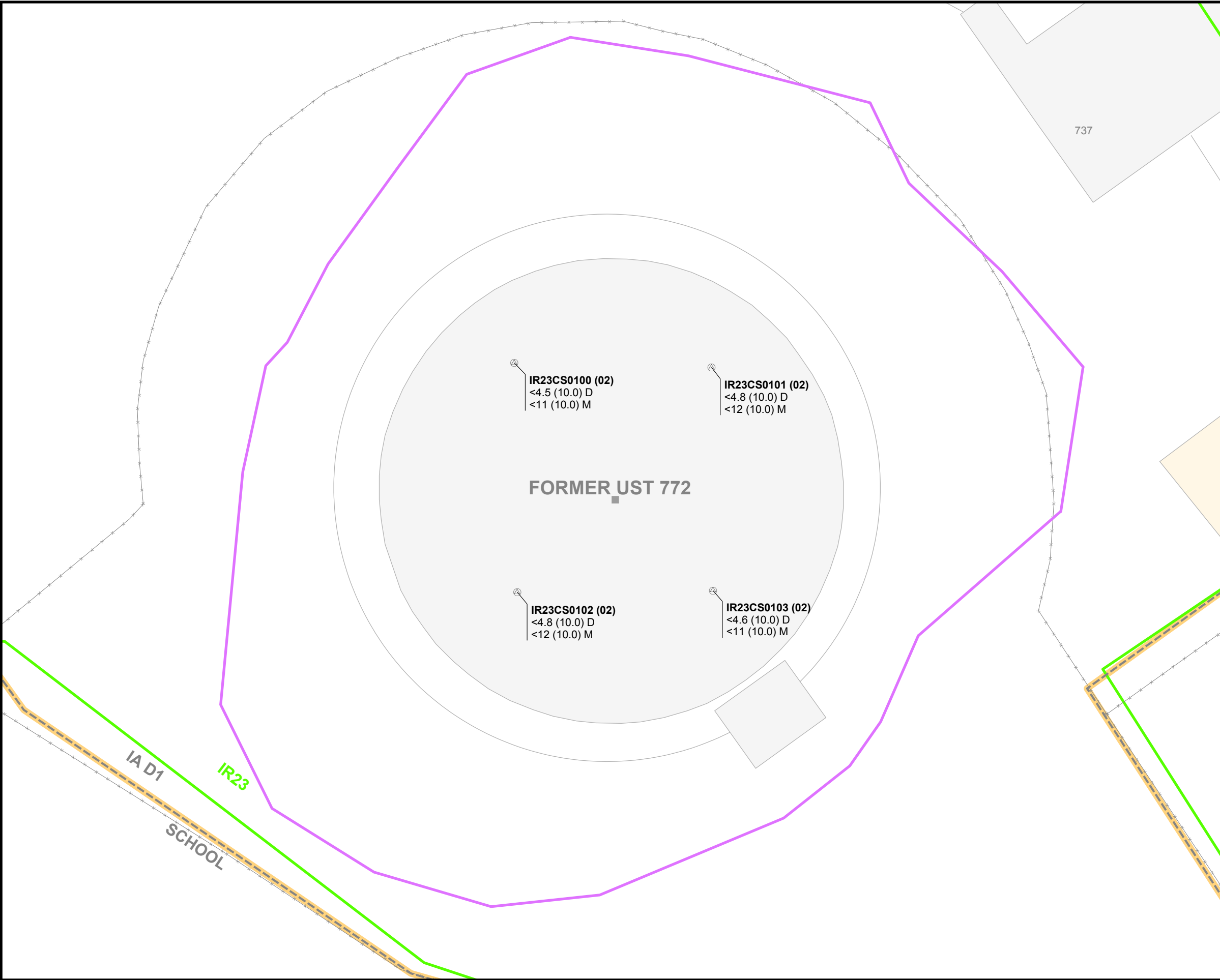
**TABLE 3-9**  
Summary of CERCLA Sites Investigation Area D1 that Require Further Action  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Environmental Site	Constituents of Concern and Maximum Remaining Concentration (mg/kg)	Future Land Use	Cleanup Goal
			covenant
Building H73 AL#06	PCBs: 3.5 mg/kg (concrete)	Educational/Civic	Land-use covenant: maximum of 10 mg/kg and average of less than 5 mg/kg.
			0.22 mg/kg in soil
Building H83 AL#01	PCBs: Cleanup plan in progress for concrete	Educational/Civic	Land-use covenant: low occupancy area - 25 mg/kg in concrete

**Notes:**

J = estimated concentration.



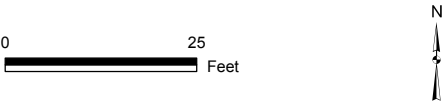


LEGEND

- COMPOSITE SAMPLE
- INVESTIGATION AREA
- FENCES
- MARE ISLAND 1859
- RAILROADS
- IR23\_EXCAVATION
- EARLY TRANSFER PARCEL
- GROUP I SITES
- GROUP II, III SITES
- ROADS
- STRUCTURES
- WATER
- WETLANDS

SAMPLE LOCATION  
CONCENTRATION (mg/kg)  
SAMPLE BEGINNING  
DEPTH (ft BGS)  
SAMPLE COLLECTION YEAR

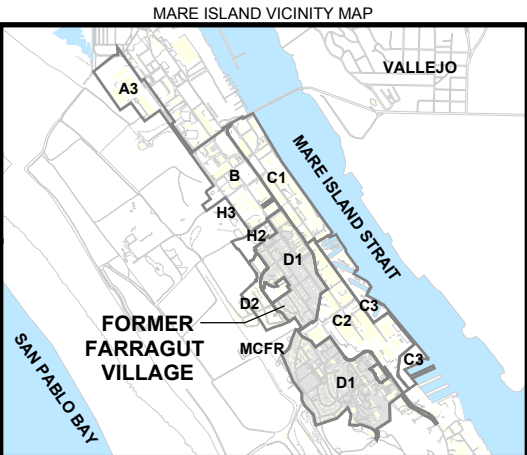
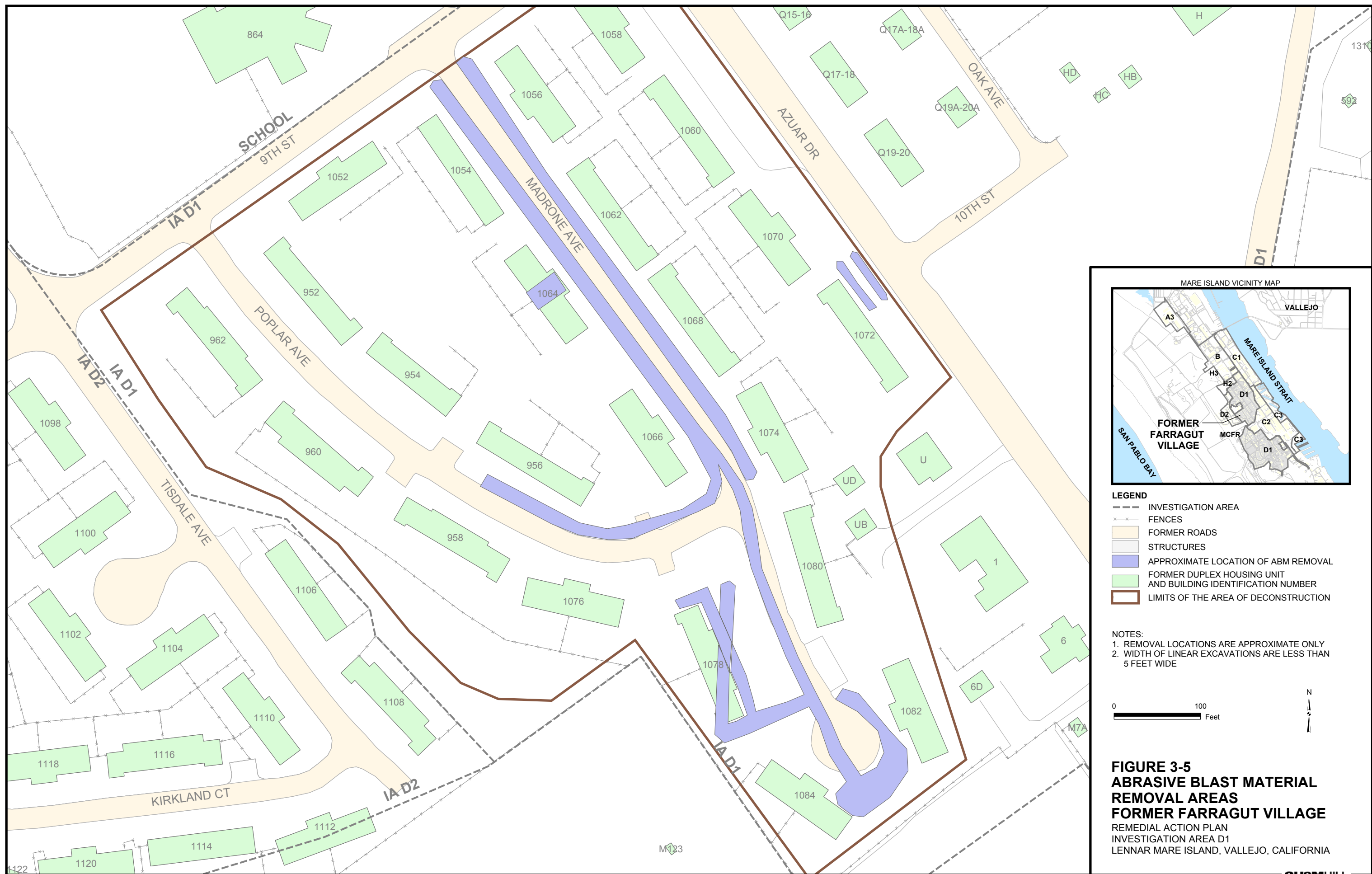
- NOTES:
- < = NOT DETECTED AT OR ABOVE THE INDICATED CONCENTRATION
  - ANALYTE ABBREVIATIONS  
DIESEL = (D)  
MOTOR-OIL = (M)
  - MEDIUM GRAY SYMBOL = OTHER SAMPLE LOCATIONS



**FIGURE 3-2**  
**IR23 CONFIRMATION SOIL**  
**SAMPLE LOCATIONS**  
REMEDIAL ACTION PLAN  
INVESTIGATION AREA D1  
LENNAR MARE ISLAND, VALLEJO CALIFORNIA

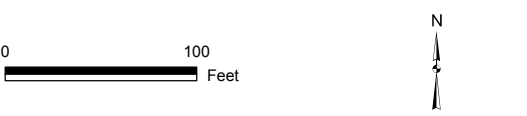




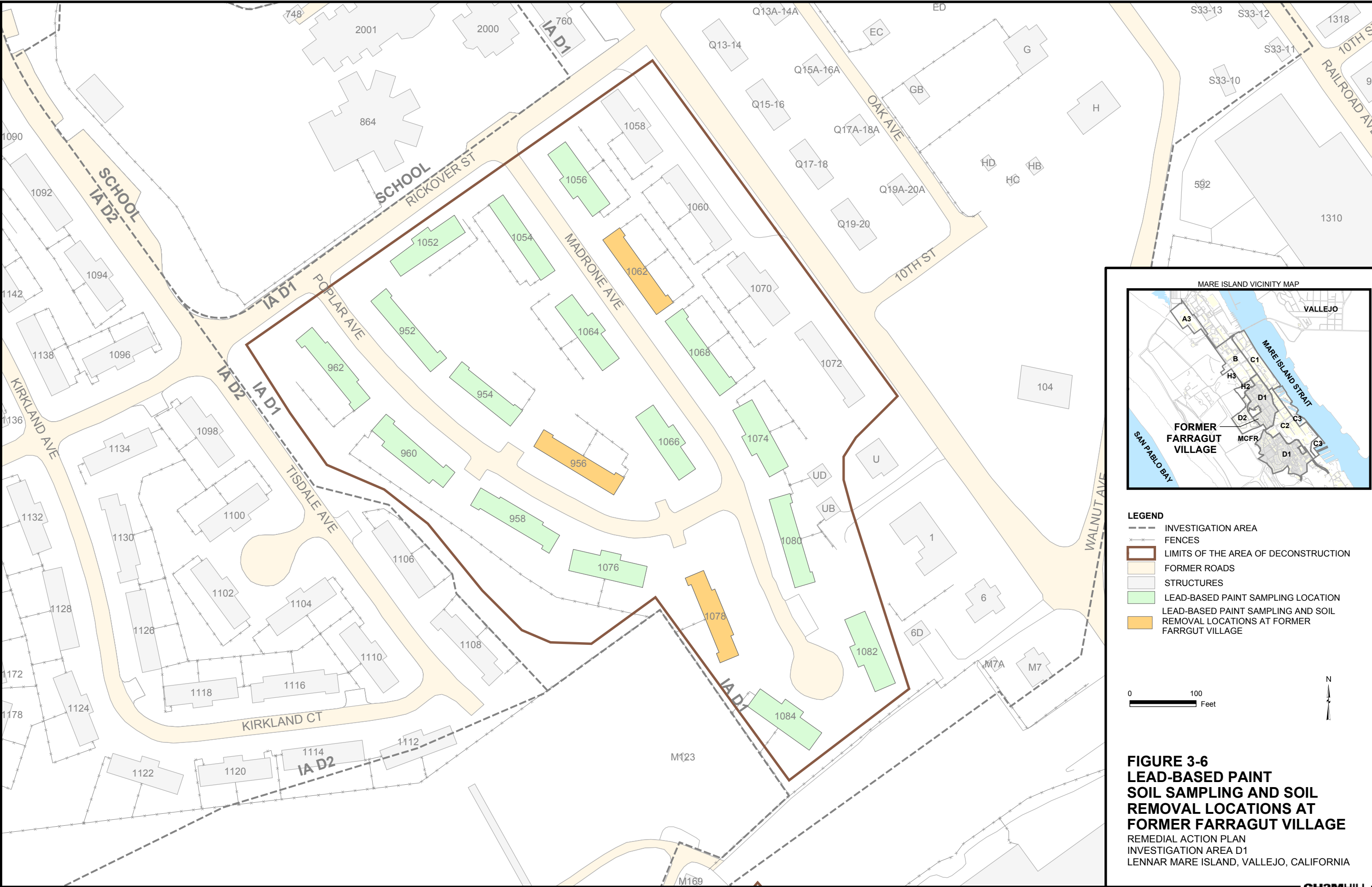


- LEGEND**
- INVESTIGATION AREA
  - x-x- FENCES
  - FORMER ROADS
  - STRUCTURES
  - APPROXIMATE LOCATION OF ABM REMOVAL
  - FORMER DUPLEX HOUSING UNIT AND BUILDING IDENTIFICATION NUMBER
  - LIMITS OF THE AREA OF DECONSTRUCTION

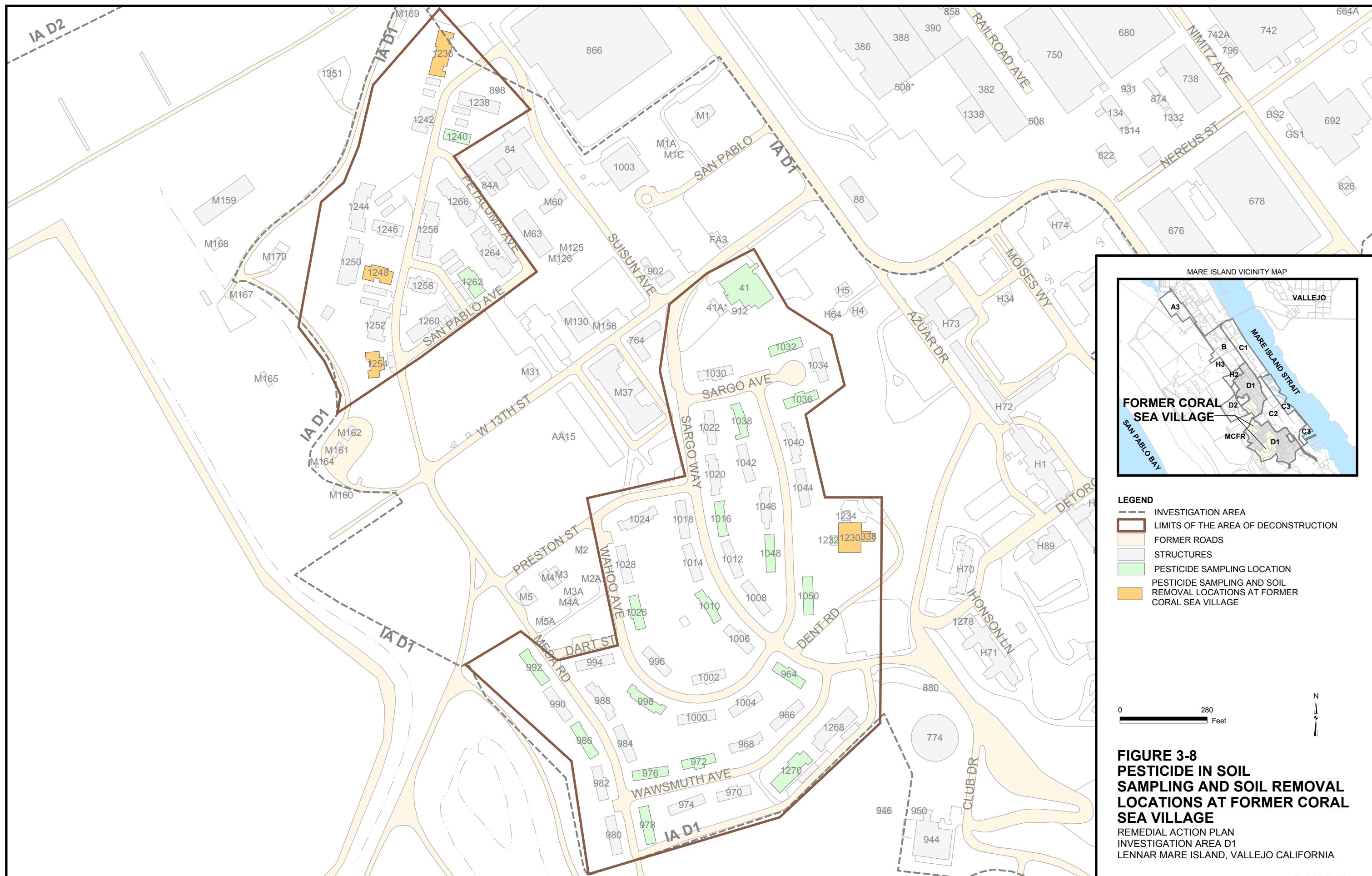
NOTES:  
1. REMOVAL LOCATIONS ARE APPROXIMATE ONLY  
2. WIDTH OF LINEAR EXCAVATIONS ARE LESS THAN 5 FEET WIDE

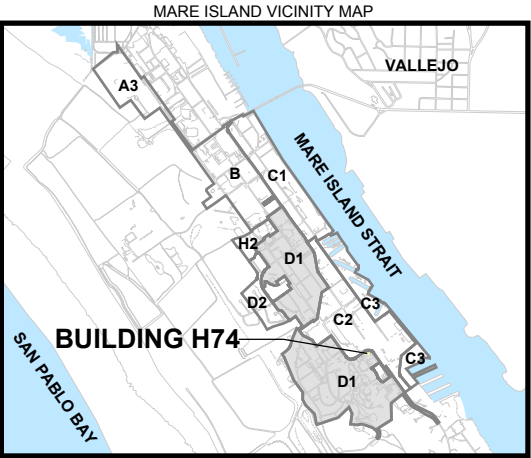
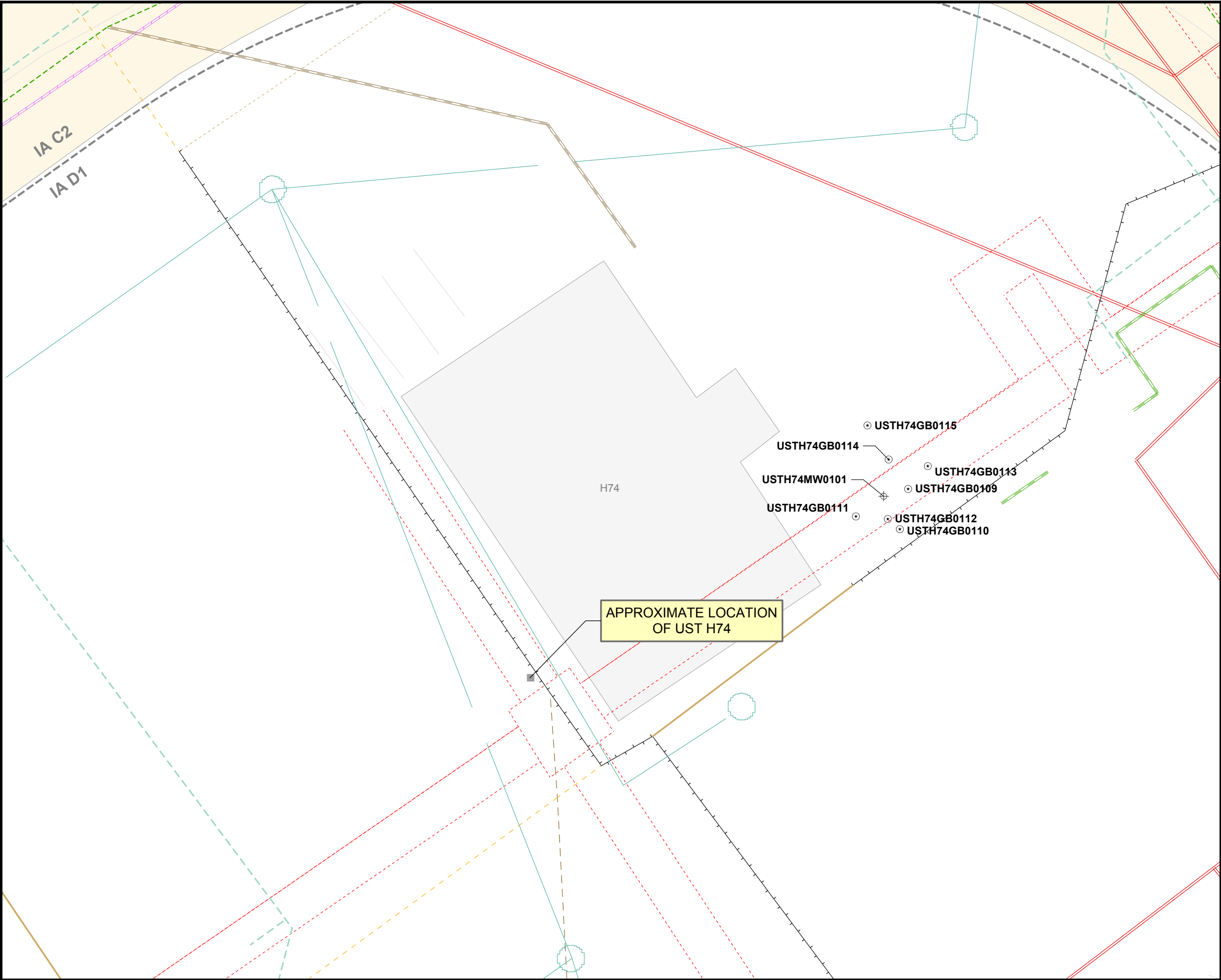


**FIGURE 3-5**  
**ABRASIVE BLAST MATERIAL**  
**REMOVAL AREAS**  
**FORMER FARRAGUT VILLAGE**  
REMEDIAL ACTION PLAN  
INVESTIGATION AREA D1  
LENNAR MARE ISLAND, VALLEJO, CALIFORNIA

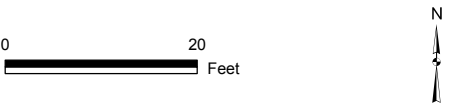








- LEGEND**
- ⊙ GEOPROBE SAMPLE
  - ⊕ MONITORING WELL
  - INVESTIGATION AREA
  - UNDERGROUND ELECTRICAL UTILITY
  - - - ABANDONED FUEL OIL PIPELINES
  - FLUSHED FUEL OIL PIPELINES
  - - - FUEL OIL PIPELINES NOT FOUND
  - REMOVED FUEL OIL PIPELINES
  - - - UNKNOWN FUEL OIL PIPELINES
  - GAS PIPELINES
  - - - OTHER WATER PIPELINES
  - SALTWATER PIPELINES
  - - - BACKBONE SEWER PIPELINES
  - SEWER SERVICE LINES
  - - - STEAM PIPELINES
  - STORMWATER PIPELINES
  - ROADS
  - STRUCTURES



**FIGURE 3-9  
BLACK GRANULAR MATERIAL  
NEAR BUILDING H74 SAMPLE  
LOCATIONS**  
INVESTIGATION AREA D1  
REMEDIAL ACTION PLAN  
LENNAR MARE ISLAND, VALLEJO, CALIFORNIA

## 4.0 Remedial Alternatives and Recommended Remedial Actions

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The sites and environmental issues identified in IA D1 that have been evaluated include:

- Two IRP sites (IR23 and a portion of IR14).
- One Group II/III site (sanitary sewer pipelines and pump stations in IA D1).
- PCB sites.
- LBP in soil within the former Farragut and Coral Sea Villages.
- LBP in soil around existing structures in IA D1 (outside of the former Farragut and Coral Sea Villages).
- ABM in soil.
- Pesticides in soil at the former Coral Sea Village.
- Black granular material near Building H74.

The majority of the above-listed sites and environmental issues in IA D1 have been resolved such that no further action is required for unrestricted use. These sites are summarized in Section 4.1 below. The sites that require further action and the recommended remedy are summarized in Section 4.2.

### 4.1 NFA Sites

One of the Group I IR sites located within IA D1, IR23, does not require further action. IR23 has been closed following remediation associated with the removal actions, which was considered adequate to be protective of human health and the environment, as presented in this RAP and in the *Removal Action Summary Report and Request for Closure for IR23* (CH2M HILL 2002a) approved by RWQCB and DTSC (RWQCB 2004; DTSC 2004). No environmental concerns are associated with the one Group II/III site – the sanitary sewer system (including DOM-10 and DOM-18) in IA D1 – that did not handle industrial waste, as documented in the *Sanitary Sewer Technical Memorandum* (CH2M HILL 2002b).

Following removal and off-site disposal of ABM, no further action is required in the former Farragut and Coral Sea Villages. The ABM has been excavated and properly disposed off site to be protective of human health and the environment, as documented in the *Final Technical Memorandum for the Removal of Abrasive Blast Material in Soil at Former Coral Sea Village and Former Farragut Village, Investigation Area D1 Deconstruction Area* (CH2M HILL 2004a). If significant quantities of ABM are encountered during future development activities in IA D1, it will continue to be handled in accordance with procedures established by DTSC. A procedure for managing ABM will be developed as part of RAP implementation.

The soil impacted with LBP and pesticides as identified during the 2002 and 2003 sampling events in the former Coral Sea and Farragut Villages were removed as summarized in the *Evaluation of Lead-based Paint in Soil at the Former Coral Sea Village and the Former Farragut Village/Touro University Housing Area, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004b) and the *Evaluation of Pesticides in Soil at the Former Coral Sea Village, Investigation Area D1 Deconstruction Area, Lennar Mare Island, Vallejo, California* (CH2M HILL 2004c). No further action for LBP and pesticides in soil is required in the former Farragut and Coral Sea Villages. Lead-impacted soils from LBP were removed around Buildings 926 and 928 in 2003, and DTSC concurred that no further action is necessary to allow unrestricted use of the buildings.

The black granular material identified near Building H74 has been adequately characterized, and evaluation of the analytical data indicates that there is no significant impact to soil or groundwater. No further action regarding the black granular material is required.

These sites and environmental issues in IA D1 have been either investigated and considered not to represent a significant risk to human health or the environment, or have been resolved to a level such that they no longer represent a significant risk to human health or the environment for the planned land use.

## 4.2 Alternatives and Proposed Remedy for Sites that Require Further Action

### 4.2.1 IR14 in IA D1

The soil and groundwater have been characterized along IR14 in IA D1, and the data indicate no evidence of unacceptable risk to human or ecological receptors are posed by constituents at IR14 in IA D1, as presented in the *Investigation Area D1 IR14 Technical Memorandum* (CH2M HILL 2003a). DTSC has identified industrial wastewater pipeline as an interim status unit under RCRA because of its appurtenance to the industrial wastewater treatment plant. In order to satisfy RCRA requirements, the pipeline within IA D1 will be inspected to ensure no waste remains in place. If waste is observed in the pipeline, flushing of the pipeline will occur until the waste is removed. The pipeline will also be inspected for major breaks in the line that may have caused release of industrial waste during operation of the system to the surrounding soils. If major breaks are observed, the adjacent soils will be sampled if there is no historical data in the same location and a work plan addressing the remediation of impacted soil will be prepared and submitted to DTSC. The soils will be removed if concentrations of constituents in the soil samples indicate a risk to human health or the environment. If, during inspection of the pipeline, no waste and no major breaks are observed in the pipeline, no further action will be required.

### 4.2.2 Lead-based Paint in Soil

LBP in soil is a common environmental issue associated with buildings built before 1978. The alternatives for remediating LBP around structures in IA D1 include characterization, soil removal and/or protective barrier placement, and potential implementation of a land-use covenant. The remedy will vary from building to building, but the process for

evaluating and selecting the appropriate remedy is the same for all buildings as described below.

Characterization of the nature and extent of lead in soil from LBP around buildings is performed consistent with the *Final Generic Sampling and Analysis Work Plan for Evaluation of Lead-based Paint and Pesticides in Soil* (CH2M HILL 2003h). The sampling methodology for evaluation of LBP in soil includes the collection of composite soil samples along each of the four drip lines around existing buildings and the collection of a discrete soil sample from the four mid-yard areas of the existing buildings. The drip-line samples are composite soil samples prepared for each side of the building or structure, using up to 10 soil samples collected on approximate 6-foot centers. The mid-yard samples are discrete soil samples collected from the approximate geographic center of the front, rear, and side yard areas of each housing unit or building. The soil samples are collected from 0 to 3 inches bgs and exclude any landscaping materials including (but not limited to) bark chips, rocks, concrete, wood, and/or vegetation.

The evaluation of the nature and extent of lead in soil from LBP consists of a comparison to criteria derived using the DTSC Lead Spread 7 model. Mare Island-specific values for lead in water and air were used in the model. The resulting risk-based threshold criterion for lead for residential land use is 210 mg/kg and for non-residential land use is 750 mg/kg. Applying these criteria and consistent with DTSC's request, the drip-line and mid-yard samples will be evaluated as presented below.

The average lead concentration on each side of the structure will be calculated using the results from both the drip-line composite sample and the mid-yard discrete sample. If the average lead concentration on a specific side of the structure exceeds the risk-based threshold criteria (210 mg/kg for residential and 750 mg/kg for non-residential), additional action is required. If the average lead concentration does not exceed the criteria, but the concentrations in any soil sample are above 400 mg/kg for residential reuse and above 1,000 mg/kg for non-residential reuse, additional action is required. If neither the average lead concentration of the drip-line composite and mid-yard discrete soil samples are above the risk-based threshold criteria (210 mg/kg and 750 mg/kg), nor the specific drip-line or mid-yard samples are above the maximum concentrations of 400 mg/kg and 1,000 mg/kg, then no further physical action is required. In the case of non-residential areas, a land-use covenant prohibiting sensitive uses including residential, hospitals, or day care centers will be recorded.

In cases where further action is required, this action may consist of soil removal or installation of a type of protective barrier to prevent exposure. Removal of lead-impacted soil will be performed in areas where the buildings are occupied. Excavation is a common and well-proven method of removing contaminated surface and subsurface materials from contaminated sites. Soil removal followed by soil verification sampling would occur along the drip-line and/or mid-yard area to 0.5 to 1 foot bgs. Excavated soil is transported by truck to a permitted landfill for burial. Prior to loading for transport, the soil is stockpiled and chemically analyzed to determine treatment requirements. Soil that is removed for disposal will be handled according to the *Final Soil and Groundwater Management Plan* (CH2M HILL 2001). Following any soil excavation, verification soil samples will be collected and submitted for laboratory analysis for lead to ensure the effectiveness of the removal action. Soil verification samples will be evaluated using the risk-based threshold criteria as

presented in the characterization section above. The total number of verification soil samples collected at each site will be dependant on the size of the excavation area. Verification samples will be collected in a systematic grid pattern and will consist of both discrete samples composite samples based on the size of the excavation. The evaluation will be used to determine if additional excavation is required or if the results indicate that no further physical action is required at that structure.

If the structure is not occupied interim surface covers such as artificial turf, bark, mulch, or gravel may be appropriate until such time as the building is demolished or becomes occupied. At that time, soil removal action would be required consistent with the process described above. Installation of surface covers would require quarterly inspection and maintenance to ensure the adequacy of the protective barrier. The surface covers would serve to eliminate the exposure pathway of direct-contact exposure to soils. These covers will be left in place for up to one year, after which a request to DTSC will be made to leave the covers in place, if needed, or soil removal actions would be performed. In addition, the condition of the covers is maintained through implementation of an inspection and maintenance program to prevent activities that could damage the covers and create exposure pathways to human receptors.

In the cases where concentrations of lead in soil are above the risk-based threshold criteria for unrestricted (sensitive) use (210 mg/kg) but are below the threshold criterion for non-residential (i.e., commercial or industrial) use (750 mg/kg), a land-use covenant would be implemented. The land-use covenant would prohibit future use of the property for sensitive uses including residential, hospitals, or day care centers. If surface covers have been installed, the land-use covenant would prohibit subsurface disturbance activities that would damage the cover. Excavation and other subsurface work could only be executed if environmental and worker safety control measures are implemented, and the cover is subsequently repaired as specified in the land-use covenant. State land-use covenants will be recorded with the County of Solano and will include provisions for enforcement.

### 4.2.3 PCB Sites

There are 19 PCB sites in IA D1 that have a proposed remedy based on maximum concentrations of PCBs remaining in place, as presented in Table 3-10. The remedial alternatives for the PCB sites in IA D1 consist of encapsulation, concrete removal, soil removal, indoor air evaluations, and land-use covenants. The PCB sites and associated proposed remedies are presented in Table 4-1. The remedies are discussed further in the following subsections.

TABLE 4-1  
Summary of PCB Sites Investigation Area D1 that Require Further Action  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

PCB Site	Proposed Remedy
Building 1322 AL#01	Encapsulation and Land-use Covenant
Building 229 UL#01	Land-use Covenant for Building 229
Building 237 AL#01	Land-use Covenant

TABLE 4-1

Summary of PCB Sites Investigation Area D1 that Require Further Action  
*Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

Building 237 AL#02	Land-use Covenant for Building 237
Building 253 AL#01	Land-use Covenant for Building 253
Building 253 AL#02	Land-use Covenant for Building 253
Building 253 AL#03	Land-use Covenant for Building 253
Building 497 AL#01	Land-use Covenant for Building 497
Building 521 AL#01	Concrete Removal and Land-use Covenant for the Former Transformer Room
Building 521 UL#01	Land-use Covenant for Building 521
Building 605 AL#01	Encapsulation and Land-use Covenant
Building 605 AL#02	Land-use Covenant for Building 605
Building 671 AL#01	Land-use Covenant for Building 671
Building 781 AL#01	Land-use Covenant for Building 781
Building 84 AL#01	Indoor Air Evaluation
Building 944 AL#02	Land-use Covenant for Building 944
Building H72 AL#01	Encapsulation and Land-use Covenant
Building H73 AL#06	Land-use Covenant for the Former Transformer Room
Building H83 AL#01	Soil and Concrete Removal and Land-use Covenant for Former Transformer Room

#### 4.2.3.1 Encapsulation

Encapsulation and land-use covenant will be the remedy for three PCB sites in IA D1, as presented in Table 4-1. Two of these sites (Building H72 AL#01 and Building 1322 AL#01) have elevated concentrations of PCBs that exist in concrete underneath an active transformer. In accordance with the CA/FO, contaminated concrete that has not exceeded its useful life may be addressed as exposure mitigation measures (USEPA et al. 2001). The active transformers at these sites are encapsulating the contaminated portion of the concrete pad (and thereby eliminating any exposure pathway).

The remaining concentrations of PCBs in concrete at Building 605 AL#01 (former telephone equipment room on the first floor) will also be encapsulated, but the process involves applying two coats of paint (solvent-resistant and water-repellant coatings of contrasting colors) in accordance with the provisions of TSCA. This encapsulation will cover the concrete floor where PCB concentrations remain. This cleanup action will be performed in accordance with Building 605 Cleanup Plan.

Reliance upon encapsulation requires recordation of a land-use covenant pursuant to 40 CFR 761.30 and the USEPA CA/FO (USEPA et al. 2001). In the event that the

transformers are taken out of service and/or a removal action is planned, procedures will be followed to ensure compliance with the TSCA and RCRA for managing PCB waste.

#### 4.2.3.2 Concrete and/or Soil Removal

Excavation is a common and well-proven method of removing contaminated surface and subsurface materials from a site. Additional concrete removal at Building 521 AL#01 will occur to remove the elevated PCB concentrations remaining in the floor of the former transformer room. Additional soil and concrete removal at Building H83 AL#01 will occur to remove the PCB-impacted media associated with the former transformer room. Removed materials will be transported by truck to a permitted landfill for disposal. Prior to loading for transport, the removed materials are stockpiled and chemically analyzed to determine treatment requirements. Soil that is removed for disposal will be handled according to the *Final Soil and Groundwater Management Plan* (CH2M HILL 2001). Following any excavation, verification samples will be collected and submitted for laboratory analysis for PCBs to ensure the effectiveness of the removal action. Verification samples will be compared to the USEPA Region 9 PRGs and TSCA cleanup levels. The total number of verification samples collected at each site will be dependant on the size of the cleanup action area. Based on TSCA guidance, verification samples will be collected in a systematic grid pattern. The evaluation will be used to determine if additional excavation is required or if the results indicate that no further action is required at that site. If soil with PCB concentrations above 0.22 mg/kg is left in place, a land-use covenant will be recorded to preclude residential use of the area. Similarly, if concrete with PCB concentrations above 1 mg/kg is left in place, a land-use covenant will be recorded to preclude sensitive uses of the site.

#### 4.2.3.3 Land-use Covenant

Eighteen PCB sites in IA D1 require a land-use covenant based on remaining concentrations of PCBs, as presented in Table 4-1. The land-use covenant would prohibit future use of the property for sensitive uses. Land-use covenants will be recorded with the County of Solano, will define the area subject to the environmental restriction, and will include provisions for enforcement.

The land-use covenant will specifically: (1) define the site and state that it was used for PCB remediation waste disposal; (2) identify the existence of any encapsulation by an active transformer (if applicable); (3) state the remaining PCB concentrations left on the site under the encapsulation (if applicable); and (4) prohibit sensitive uses (i.e., residential, hospitals, day care centers) of the site. Following agency review and approval of site closure with a land-use covenant, the restriction will be recorded by LMI, as appropriate, and a copy of the final recorded land-use covenant will be provided, along with certification of recordation in Solano County. The land-use covenant will be pursuant to Section 67391.1 to Title 22, Division 4.5, Chapter 39 of the California Code of Regulations, executed by DTSC and LMI, and recorded in Solano County. This land-use covenant will run with the land and be enforceable by DTSC.

#### 4.2.4 Summary

Following implementation of the remedies as presented above, an implementation report will be prepared for IA D1. The implementation report will provide the documentation that the remedies specified in this RAP, including the land-use covenants, have been

implemented. Upon review and approval of the implementation report, DTSC will issue certification for IA D1.

The PCB, UST, and FOPL sites are being resolved under the authority of USEPA (for the PCB sites) and the RWQCB (for the UST and FOPL sites), in accordance with the respective orders. The completion of all investigation and/or remedial action at these additional sites, and submittal of the reports concluding that no further action is required at each of the sites, will be received by DTSC prior to issuance of certification for IA D1.

## 5.0 References

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- CH2M HILL. 2001. *Final Soil and Groundwater Management Plan, Mare Island, Vallejo, California*. November.
- \_\_\_\_\_. 2002a. *Removal Action Summary Report and Request for Regulatory Closure for IR23, Investigation Area D1, Mare Island, Vallejo, California*. October.
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**Appendix A**  
**Responses to Public and Agency Comments on**  
**the Draft Final for Public Review of the**  
**Remedial Action Plan for Investigation Area D1**  
**dated April 24, 2004**

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Responses to Public and Agency Comments on the Draft Final for Public Review of the Remedial Action Plan for Investigation Area D1 dated April 24, 2004  
*Final Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

No.	Comments	Responses
<b>Responses to Oral Comments received during the April 29 Public Meeting held for the Draft Final Remedial Action Plan for Investigation Area D1, (Source: Restoration Advisory Board (RAB) Meeting Minutes)</b>		
1.	Mr. Nystrom inquired if Area D1 extends south to the ammunition depot and what is the current status of the ammunition depot.	The ammunition depot is not in Area D1. The Navy is currently completing the cleanup of the ammunition depot, which is why it remains fenced off. Once the cleanup is complete, the Navy will transfer the property to the City of Vallejo.
2.	Mr. Karr asked if the remedial action plan was available on-line?	The <i>Investigation Area D1 Remedial Action Plan</i> is not available on line. Hard copies are available at the JFK library in the Mare Island repository. CH2M HILL will look into making copies of future documents available on line.
3.	Mr. Karr inquired about the status of existing transformers that are still in service and whether they may still contain PCB oil.	Transformers currently operating on site do not contain PCB oil. The manufacturing of PCBs was prohibited in 1976.
4.	Ms. Diji inquired if there will be any work done around Captain's Row between now and September.	Yes. An evaluation is being performed currently for lead in soil around the structures in Captain's Row. Pending that evaluation, specific soil removal actions will be performed around some of the buildings. This work is scheduled to be performed this summer.
5.	Ms. Tygielski stated that she had some concerns with the use of a land use restrictions as a possible remedy and that for the housing near Touro University there was a restriction that no one under the age of eighteen live there, however there were married students with children that occupied some of the houses.	The married students with children that were living in houses in the former Farragut Village area were asked to leave when it was determined that they were not in compliance with the land use restrictions. Regarding future land-use restrictions, they will be enforced by DTSC and, in the case of the PCB sites, by both USEPA and DTSC.
6.	Ms. Hayes asked how DTSC and U.S. EPA enforce land use restrictions.	DTSC enforces land-use restrictions through inspections and assigning penalties where violations are noted. The agencies maintain an active role after the cleanup to be vigilant, ensure the restrictions are being enforced, and to respond if the restrictions are violated.  DTSC also has a consent agreement with Lennar, the property owner, and Lennar has a responsibility to make sure that the land-use restrictions are enforced. The properties are purchased by the new owners with the understanding that only specific land use, based on the restriction, is suitable for the specific property.
7.	Ms. Hayes asked what types of sites are you proposing encapsulation and land use controls on PCBs and lead?	There are three PCB sites in IA D1 that have a proposed remedy of encapsulation. The proposed remedy is encapsulation at two sites where non-PCB oil transformers are currently active over a concrete pad where PCBs were detected. The operating transformers serve as a barrier over the concrete, thereby encapsulating the PCBs in concrete. Encapsulation of one PCB site is proposed on the floor of a room in a basement where two layers of paint will be applied to the floor encapsulating the

Responses to Public and Agency Comments on the Draft Final for Public Review of the Remedial Action Plan for Investigation Area D1 dated April 24, 2004  
*Final Investigation Area D1 Remedial Action Plan, Lennar Mare Island, Vallejo, California*

No.	Comments	Responses
		<p>PCB-impacted floor.</p> <p>There are 18 PCB sites in IA D1 where a land-use restriction is proposed based on the proposed future land use.</p> <p>A land-use restriction is appropriate for these PCB sites as well as certain lead-based paint in soil sites because the future land use is not a sensitive use area such as residential, day care centers, or hospitals. Because the future land use at these sites is already planned to be for restricted land uses such as industrial or commercial uses, the residual concentrations of PCBs or lead can be slightly higher as long as a land-use restriction is recorded to prohibit sensitive uses.</p>
8.	Ms. Hayes inquired about examples of protective barriers which are listed in the fact sheet as a proposed remedial action for lead in soil from lead-based paint.	Protective barriers for preventing exposure to lead in soil from lead-based paint may include artificial turf, 6 inches of mulch, bark, and/or gravel.
9.	Ms. Hayes asked what measures will Lennar and/or its buyers take to ensure that soil around structures that has been remediated from lead-based paint is not recontaminated?	Lennar is working with CH2M HILL to address buildings that have existing sources of lead-based paint. Steps that may be implemented in conjunction with the soil removal include scraping and/or re-painting of structures to prevent re-contamination.
10.	Ms. Tygielski stated that although an area may be designated commercial, and there may be daycare centers in there for the people who work there.	There is language included in the land-use restriction that prohibits use of the area for sensitive uses including residential, day care facilities, or hospitals.
11.	<p>Ms. Hayes stated that in addition to land use controls, there is one other remedy that the building, or the landowner would have, and that is removal of the source. For example, if a transformer gets replaced, and in the case of lead-based paint, when, when it gets removed or satisfactorily encapsulated, the source would be addressed.</p> <p>Ms. Hayes stated that land use controls are the minimum to be done under the current scenario, and that land use restrictions could be reconsidered on a property-by-property basis once the properties are parcelized if the source had been removed.</p>	Each specific environmental site is being evaluated to determine if the current condition is appropriate for the proposed future land use. This factor is considered when selecting the appropriate remedy for each site, and in IA D1, the remedies include removal actions at many of the sites and land-use restrictions at a few of the sites. It is possible that the need for some of the land-use restrictions would be eliminated in the future. For example, if an operating electrical transformer provides a barrier to PCB contamination, that contamination would be removed when the transformer was removed or replaced.
12.	Ms. Krevsky asked if the restrictions include locking up a building or room in a building so no one goes inside even after it is sold?	Some sites are in buildings that may include locks or site controls for other reasons than the environmental contamination; for example, the substations run by Island Energy. The purpose of the land-use controls is to prevent certain uses of the area such as residential use. The residual concentrations in an area with a land-use restriction are appropriate to allow people to be in the room occasionally without a health risk.

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13.	Mr. Gibbons asked why the entire industrial wastewater treatment piping, not just the portion in IA D1, was not surveyed:	The industrial wastewater treatment piping is no longer in use. The survey along the section of the pipeline that runs through IA D1 was prioritized to complete the cleanup activities within this specific investigation area. There is over 25,000 feet of industrial wastewater pipeline throughout Mare Island. Initially, the section in IA D1 will be evaluated and, based on the results, the need to survey the other sections of the pipeline outside of the IA D1 area will be discussed with DTSC.
14.	Mr. Gribble asked on what basis do you state that the Navy cleaned and flushed the system?	Historical documentation such as field notes and the statement that the system was cleaned and flushed was included in previous reports by the Navy. There is not, however, a report that presents a summary of the cleaning and flushing; therefore, the inspection of the line will be used to confirm if the Navy cleaned and flushed the line.
<b>Responses to Written Comments from Lea Loizos, Arc Ecology on the Draft Final Remedial Action Plan for Investigation Area D1, received on May 21, 2004.</b>		
1a.	Using the DTSC Lead Spread 7 model, risk-based threshold criteria were developed for residential and non-residential land use. Please include an explanation of what types of reuses are considered non-residential. For example, would a playground fall into a non-residential or residential reuse? What about a day care center or school site?	Non-residential reuses within IA D1 include industrial, commercial, historic core, and educational/civic land uses. Playgrounds, day care centers, and schools with children under 18 are considered sensitive uses and would only be allowed under the residential, or unrestricted, land use.
1b.	According to Section 4.2.2, if the average lead concentration does not exceed the risk-based threshold criteria, but the concentrations in any soil sample are above 400 mg/kg for residential reuse and above 1000 mg/kg for non-residential reuse, additional action will be required. If the risk-based threshold criterion for lead in residential soils is 210 mg/kg and 750 mg/kg for non-residential reuse, how did Lennar/CH2M HILL decide upon 400 mg/kg and 1000 mg/kg as action levels for discrete samples? Why are the Lead Spread 7 criteria not used?	The Lead Spread 7 criteria of 210 mg/kg and 750 mg/kg are based on a long-term exposure scenario. The average of the individual sample results from the yard is more representative of long-term exposures than individual sample results. Therefore, it is appropriate to compare the Lead Spread 7 criteria to the average sample results, rather than to the individual results. However, as an extra measure of protection to ensure that no "hot spots" remain at the site, each individual sample result is also compared to the slightly higher criterion, (400 mg/kg or 1,000 mg/kg).
1c.	Section 4.2.2, page 4-3 states, "If neither the average lead concentration of the drip-line composite or mid-yard discrete soil samples are above the risk-based threshold criteria, nor the specific drip-line or mid-yard samples are significantly above the criteria, then no further action is required." What qualifies as significantly above the criteria? It is important that the action criteria be well defined to ensure that the community is comfortable with	This statement has been changed in the Final RAP to say "If neither the average lead concentration of the drip-line composite or mid-yard discrete soil samples are above the risk-based threshold criteria (210 mg/kg and 750 mg/kg), nor the specific drip-line or mid-yard samples are above the maximum concentrations of 400 mg/kg and 1,000 mg/kg, then no further physical action is required."

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	the criteria. As written, it is unclear how a sample will be determined as significantly different from the risk-based threshold criteria. Please clarify.	
1d.	As indicated in the comments sent by the RAB Technical Focus Group of December 11, 2002, on the <i>Draft Methodology for Evaluation of Lead in Soil at Lennar Mare Island; Draft Generic Sampling and Analysis Plan for the Evaluation of Lead-based Paint and Pesticides in Soil</i> , more information about the verification sampling is needed. The report states that verification soil samples will be collected following any soil excavation to ensure the effectiveness of the excavation and that the total number of verification soil samples collected will be dependant on the size of the removal area. What is the ratio of the number of samples per unit area? How will Lennar/CH2M HILL determine if additional excavation is required? If excavation is required, will soil be excavated until levels of lead are below threshold criteria or will excavation stop at a certain depth? Please include more details about the excavations and verification sampling.	<p>Soil verification samples will be collected using similar procedures used to characterize the soil for lead from lead-based paint. Following excavation along the drip line of the building, a composite soil sample will be collected along the same alignment as the characterization sample (approximately 1 foot away from the building). Excavation activities that carry into the middle of the yard will have an additional composite sample collected along the length of the building at the location of the characterization sample. The composite samples will be collected at approximately 10-foot centers along sections of the drip-line or mid-yard area not to exceed 60 feet.</p> <p>To determine if additional excavation is required, the soil verification sample results will be compared to the risk-based threshold criteria. The excavation of lead in soil will be performed until the levels of lead are below the site cleanup criteria. There is no depth limit; however, historically, lead in soil derived from LBP has been shown to be most concentrated in the upper 6 inches of soil.</p>
1e.	Who will be responsible for monitoring and maintaining the interim surface covers that are proposed at unoccupied structures?	The land owner will be responsible for monitoring and maintaining interim surface covers under DTSC oversight. As included in the RAP, if this remedy is used, it will include requirements for the monitoring and maintenance of the cover, as well as reporting to DTSC.
2.	<p>There is little to no explanation of why 18 of the 19 remaining PCB sites require land-use covenants, with the exception of those currently encapsulated by active transformers. Experience has shown that land-use controls are often forgotten shortly after being put in place. Indeed, a classic example of forgotten land-use restrictions exists in Lennar Mare Island's recent history; students with young children were found living in an area whose land-use covenant stated that no one under the age of 18 should live on the property due to potentially high levels of lead.</p> <p>Land-use controls are difficult to monitor, difficult to manage, and extremely unreliable. Judging by the information given in the report, there is no reason that the PCBs at these sites cannot be removed. It is unclear how this is the best remedial alternative when weighed against the nine criteria in the NCP.</p>	The remaining concentrations of PCBs at the sites where land-use covenants are proposed are appropriate for the intended future land use. The majority of the land-use covenants proposed in IA D1 are in the areas proposed for industrial use. In the industrial use areas, sensitive uses are prohibited regardless of the residual PCBs at certain sites. The cost to remove the low levels of PCBs remaining at the sites would not be warranted because the residual concentrations are protective for the intended future land use. Because there would be no increased protection, further removal of the residual PCBs is not economically feasible.

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	In a situation such as this, where removal of the contamination is feasible, restricting use of the property rather than restoring it to its full potential is inappropriate and unacceptable. We strongly urge you to consider removal of all PCB contaminated media. If excavation is deemed not possible, an explanation of infeasibility needs to be provided.	
3.	We recently received a final technical memorandum for the removal of abrasive blast material in soil at Chapel Park, IA D1, dated May 13, 2004. There does not appear to be any mention of this area in Section 3.2.5.1 nor anywhere else within the remedial action plan. Please include a summary of the contamination found in this area and the associated removal actions that were conducted.	The summary of the removal of abrasive blast material in soil at Chapel Park has been added to Section 3.2.5.1 of the RAP as requested.
4.	As mentioned in Section 3.2.5.1, due to the historical use of spent abrasive blast material (ABM) as pipeline bedding and backfill at Mare Island, reporting procedures for future encounters of ABM have been established by DTSC. These procedures should be included in Section 4 as part of the remedial alternatives in the event that ABM is encountered during redevelopment of the area.	<p>A description of the remedial actions taken to date with respect to ABM are included in Section 3.0. The following text has also been added to Section 3.0 of the RAP: "ABM may exist in other areas of IA D1, and if, during future development activities, ABM is encountered, it will continue to be handled under DTSC oversight. A procedure for managing ABM will be developed as part of RAP implementation."</p> <p>In addition, the following text has been added to Section 4.0: "If significant quantities of ABM are encountered during future development activities in IA D1, it will continue to be handled in accordance with procedures established by DTSC. A procedure for managing ABM will be developed as part of RAP implementation."</p>